DOMESTIC ENGINEERING

VOL. 23. NO. 1. Chicago APRIL FIFTEENTH, NINETEEN HUNDRED AND TWO New York WHOLE NO. 150

NEW YORK, BOSTON, MINNEAPOLIS, DENVER, PHILADELPHIA, ST. LOUIS, LONDON, HAMBURG **AMERICAN RADIATOR CO.** GENERAL OFFICES LAKE & DEARBORN STS. CHICAGO.

A Fact!

we wish to emphasize. You can buy of us with your eyes shut and not go wrong. Our

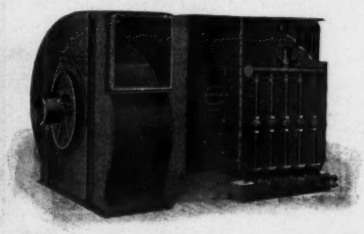
GROUND KEY, FULLER, and COMPRESSION WORK

is the best that is made. Get our Catalogue.

Glauber Brass Mfg. Co.
CLEVELAND, OHIO

PATTERNS
GOBEILLE PATTERN CO. Cleveland, O.

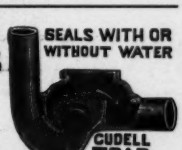
HEATING-VENTILATING-DRYING



BUFFALO FORGE CO., BUFFALO, N. Y.

The Pattern Shop of the East
H. B. OLMSTEAD CO.
87 FRANKFORT ST., NEW YORK

F. E. Cudell's PATENT sewer gas and back-water **trap**



for wash bowls, sinks, bath and wash tubs

Put into the White House by the U. S. government. For venting use vent trap.

CLEVELAND, OHIO

CRANE VALVE CO. Boston. New York. Chicago
CRANE LEAK-PROOF GLOBE and ANGLE VALVES
All Parts Renewable Tested for Highest Pressures

See our Advertisement...Page 389

WHAT A DIFFERENCE

In the quality of Plumbing work.

RAYMOND'S

COMBINATION FERRULES MAKE RELIABLE CONNECTIONS BETWEEN LEAD AND IRON PIPES.

WHY?

Because they have an extra thickness of lead over the shoulder, giving strength where it is needed, and where other Lead Ferrules are weak.

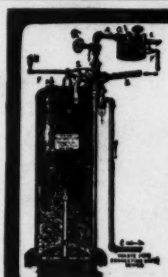
The genuine article bears our label.

RAYMOND LEAD COMPANY, CHICAGO.

JENKINS' IMPROVED AUTOMATIC AIR VALVES

Suitable for high or low pressure. Takes no more room than ordinary air cock. Endorsed by the leading steam experts as the best made and the quickest working. All genuine stamped with our Trade Mark.

JENKINS BROS., New York Boston Chicago Philadelphia



Constructed under the Jewell Warren Continental & Hyatt Patents

GRAVITY AND PRESSURE FILTERS
WRITE FOR CATALOGUE

New York Continental Jewell Filtration Company

40-42 W. Quincy St., CHICAGO. 15 Broad St., NEW YORK.

Here is Something New for You.

The **Matchless Chemical Gas Igniter**

Is a new invention—easily attached to the chimney of all Welsbach lamps, **which lights the gas** whenever it is turned on. Safer, quicker, handier, cheaper than Matches. Sample mailed for **25 cents.**

MATCHLESS CHEMICAL CO.
6420 STONY ISLAND AVE., CHICAGO

LIGHTED BY FRINK REFLECTORS::

CARNEGIE LIBRARY
PITTSBURGH

I. P. FRINK, 551 Pearl St., NEW YORK

SEE ADV. ON PAGE XVII

PARAGON BOILER
ISAAC A. SHEPPARD & CO., - PHILADELPHIA

FOR 25 YEARS The World Has Known the Excellence of Crosby Steam Appliances. None so Efficient and Durable. Design and Workmanship Unrivaled **CROSBY STEAM GAGE & VALVE CO.** BOSTON. NEW YORK. CHICAGO.

EARDSLEE CHANDELIER MFG CO. 259 and 261 MADISON ST. CHICAGO
GAS & ELECTRIC FIXTURES FOR THE TRADE.
CATALOG SENT PREPAID TO DEALERS MENTION THIS PAPER

Cleveland Patent Compression Work.
Made of Red Metal. Original in Design. Metal well Distributed.
Send a trial order. **The Central Brass Mfg. Co., Cleveland, O.**

TD1*
D66
V.23

Of what material is the Ideal Tank Heater made?

It is constructed throughout of the highest grade of cast iron, and of a mixture which has by exhaustive experiments and tests been shown to be eminently the best for the purposes.

Ideal Tank Heater.

Send for our new Complete Catalogues of
Ideal Boilers
and
American Radiators.

AMERICAN RADIATOR COMPANY

Lake and Dearborn Streets

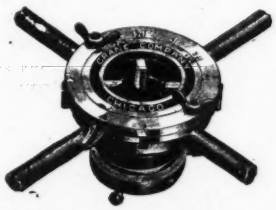
NEW YORK
BUFFALO
MINNEAPOLIS

CHICAGO

PHILADELPHIA
ST. LOUIS
DENVER

OHIO STATE
UNIVERSITY

CRANE STEAM AND GAS FITTERS' TOOLS



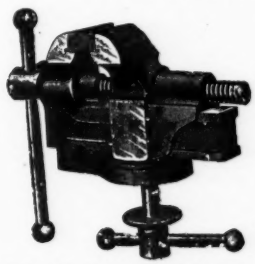
SCREW PLATES, RATCHET DIE STOCKS, RATCHET PIPE CUTTERS, ETC.

WRITE FOR CATALOGUE SHOWING OUR COMPLETE LINE OF VALVES, FITTINGS, PIPE AND TOOLS.

CRANE IMPROVED
ADJUSTABLE DIE PLATE
WITH LEADER SCREW

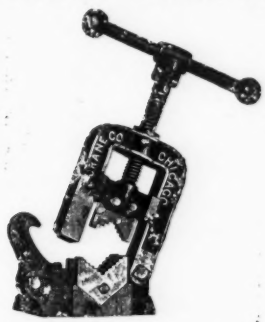
HAS FEWEST POSSIBLE NUMBER OF PARTS, AND ALL PARTS ARE INTERCHANGEABLE

WE ALSO MAKE THE
COMMON SCREW PLATE
WITH SOLID DIES



BENCH VISES

CRANE
MALLEABLE IRON PIPE VISE
WITH CUT STEEL JAWS



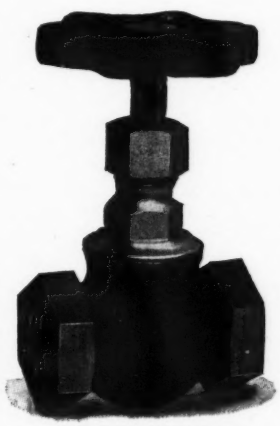
LIGHTER, CHEAPER AND STRONGER THAN CAST IRON.

NEW YORK
PHILADELPHIA
CINCINNATI
KANSAS CITY
SIOUX CITY
OMAHA

CRANE CO.
CHICAGO
ESTABLISHED 1855

DULUTH
ST. PAUL
ST. LOUIS
MINNEAPOLIS
LOS ANGELES
SAN FRANCISCO
PORTLAND, ORE.

STANDARD BRASS VALVES



GLOBE VALVE

These illustrations are photo reproductions of the original and show our idea in distributing metal to obtain best results, a standard of excellence embodied in all goods of our manufacture.

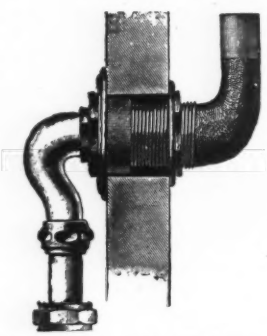
ANGLE VALVE

WESTERN TUBE COMPANY
GENERAL OFFICES AND WORKS
KEWANEE, ILL.

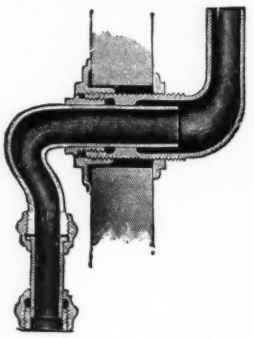
103866

The "S and K" Improved Adjustable Inlet and Outlet Connections for

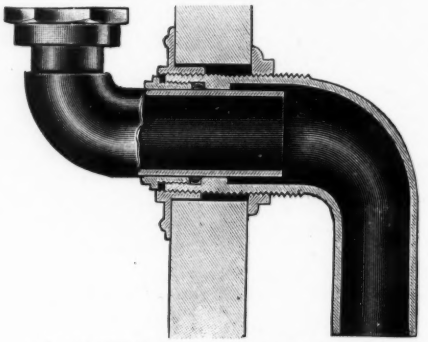
SYPHON JET URINALS



Urinal Inlet Connection for Syphon Jet Urinals.



Sectional View of Inlet Connection.



Urinal Outlet Connection for Syphon Jet Urinal.

Does not require open space back of stall, all joints can be made from the front, Urinal can be easily replaced, as the construction of the adjustable arrangement of the "Inlet" is such that adjustment both vertical and horizontal is possible. A special feature of the Inlet is that it has a *Full 1 inch Water Way giving a Large Flush.* Inlet Connections made for 1¼ inch and 1½ inch I.P.S. thd, brass spuds on urinal. Outlet Connections for 1½ inch and 2 inch I.P.S. thd, brass spuds on urinal. *Special prices to the trade.*

STREET & KENT MFG. CO. MANUFACTURERS OF PLUMBERS' BRASS WORK **CHICAGO, ILL.**

NEW YORK OFFICE, 81 Fulton St.

WE HAVE IT

A VERTICAL SECTIONAL STEAM HEATER

WITH A

STEADY WATER LINE

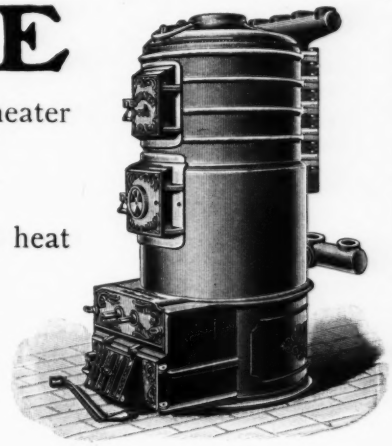
We absolutely guarantee our Henderson Thermo Steam Heater to work with a steady Water line with any reasonably good system of piping.

TRY ONE ON YOUR NEXT CONTRACT

THE PRIZER-PAINTER STOVE & HEATER CO.

READING, PENNSYLVANIA.

ALL INCLUSIVE



You'r in a position to know what people demand in heater construction. Do they seek economy in operation?

You Have It In "Gurney" Heaters.

Do they seek exceptional efficiency,—the greatest heat from the fuel consumed?

"Gurney" Heaters are Famous in that Respect.

Do they seek dur-ability, that feature which actually reduces cost of the heater?

"Gurney" Heaters Wear Longer Than Others.

Add to all this the fact that "Gurney" Heaters are simple in construction, easy to operate and no more expensive than many inferior makes, and you know why they prove the strongest trade attractions.

Capacities fully guaranteed. Write us about an agency. At the same time we'll send latest catalogue.

Gurney Heater Mfg. Co.

74 Franklin St., BOSTON.
111 Fifth Ave., NEW YORK CITY.
Western Selling Agents James B. Clow & Sons, Franklin and Harrison Streets, Chicago.

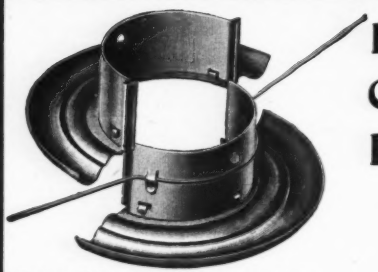
Willing Workers—

that's the kind. Work 365 days in the year—no holidays; no strikes; no "off" days. There are no more reliable closets than the Trenton Potteries Company's. Their working qualities are guaranteed. : : : : : : : : : : : :

The closet here illustrated is as fine a working fixture as was ever turned out of any pottery. Has 3-inch seal against sewer gas. Extra large water surface in bowl. Large openings through traps. Roughs in 8¾ inches to end of tail piece, or 12 inches with lowdown tank. 1¼ inch supply for high tank; 2 in. for low tank. Positive action.

SYPHON ACTION HOPPER AND TRAP.
No. 21 (Fig. 307 B).

THE TRENTON POTTERIES CO., TRENTON, N. J.



Patented Nov. 3d, 1896, June 14th, 1898

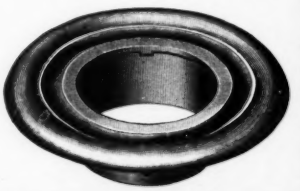
H. B. Perfection Ceiling Plate

Never Falls Down

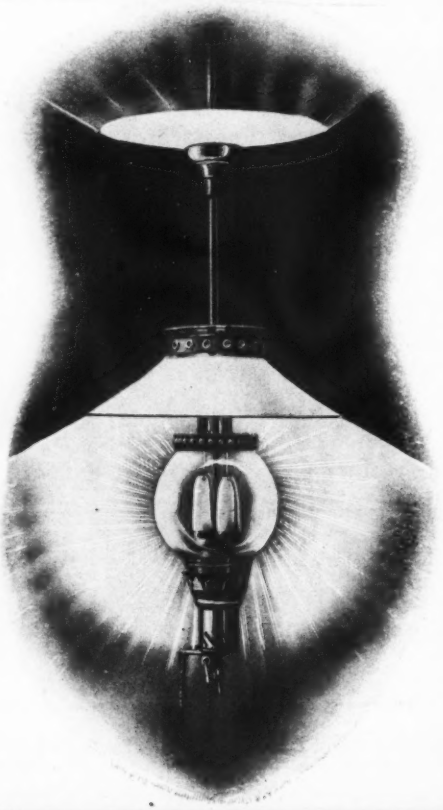
Other plates are very good plates, but the H. B. Plates are better. They snap up and stay up. Don't forget, They snap up against the ceiling instead of on the pipe.

HOUGHTON & BUXTON MANUFACTURING COMPANY
WORCESTER, MASS.

H. B. Perfection Floor Plate



Holds The Drip



A DOORENBOS

Gas Arc Lamp

Will about double the life of your mantles. The globe will last for years. Less expensive to maintain than any other gas arc lamp on the market. Nothing to get out of order.

ONE OF THE MANY TESTIMONIALS. LET US SEND YOU SOME OTHERS.

ST. MARTIN'S CHURCH
59th Street and Princeton Avenue
J. M. Schaefers, Pastor

Sanitary Specialty Mfg. Co. Chicago, March 19, 1902.

Gentlemen:—

Three of your Doorenbos Gas Arc Lamps we have been using for the last 2½ months and I must say, they give perfect satisfaction. They are fully as good as advertised. Whilst they give the best light ever produced and by far superior to electric light, the cost of fuel is less, and much less compared with electric light. Wherever I saw an opportunity I have recommended your lamps. This article demands the best recommendation and being for the benefit of the gas consumer. I hope you will sell many of them. Wishing you the best of success I am,

Respectfully yours,
[Signed] J. M. Schaefers.
Pastor of St. Martin's Church

Write for our descriptive matter and prices.

H. Verbeek, Pres. and Mgr. J. H. Brouwer, Secretary

Sanitary Specialty Mfg. Co.

MANUFACTURERS AND WHOLESALERS OF

Plumbing, Heating and Lighting Supplies

24 to 32 Milwaukee Avenue 55 to 59 N. Clinton Street

CHICAGO

Phones Main 1816 and 1817. **Sole Distributors of Doorenbos Gas Arc Lamp**

The 'PURITUS' CLOSET VENTILATOR

IN A NUTSHELL

IT REMOVES ALL ODORS WHEN CLOSET IS BEING USED AND IS NOISELESS

ATTACHABLE TO ANY CLOSET

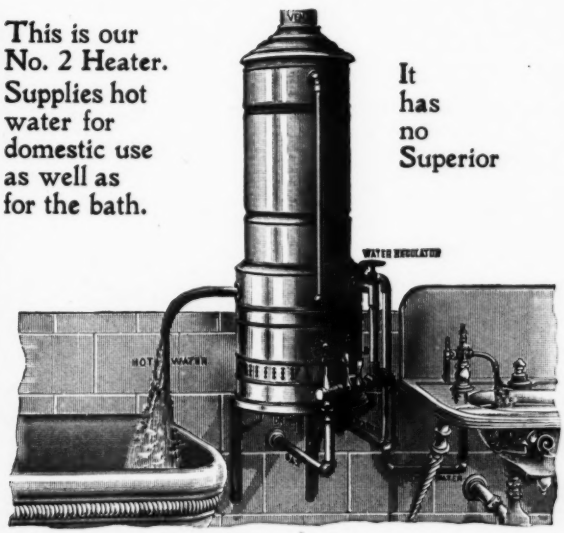
IT IS DURABLE BEING ENTIRELY CONSTRUCTED OF RED STEAM BRASS METAL AND PHOSPHOR BRONZE

WRITE FOR CATALOG AND PRICES

W. J. SCULLY VENTILATOR CO. DETROIT, MICH. MAJESTIC BLDG. TORONTO, CANADA 50 COLBURN ST.

You Can Make Money

This is our No. 2 Heater. Supplies hot water for domestic use as well as for the bath.



It has no Superior

If you push the

Humphrey Crescent Instantaneous Water Heaters

List Price Nickel Plated $35.00

including nickel plated shelf and brackets

We have many styles which range in price from our No. 10 at $45.00 to our No. 8 at only $20.00.

All Jobbers in Plumbing Goods handle the Crescent Heaters.

EVERY HEATER GUARANTEED

Send for catalogue and prices

The Humphrey Mfg. & Plating Co.

Factory and Main Offices, Kalamazoo, Michigan, U. S. A.

Our New "Excelsior" Waste and Basin

PATENT APPLIED FOR

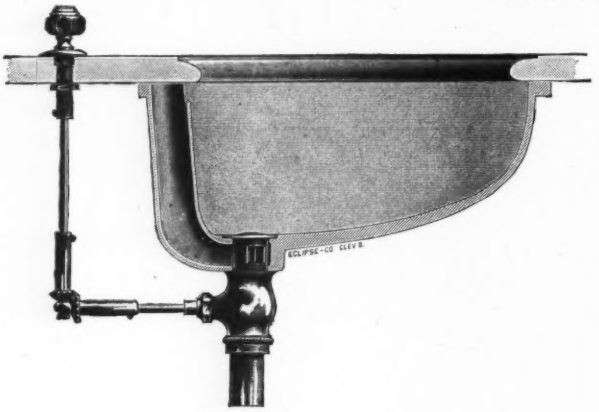


Fig. E 501.

We make the above Waste to fit the P. O. Bowls also.

THE MOST SANITARY COMBINATION ON THE MARKET.

This Waste cannot get out of order as will be readily seen. **We guarantee them in every respect.**

The Basin is the only one that can be cleaned **without removing a brass strainer.**

This Basin has no strainer, still only the dirty water can pass into the overflow, which is made in such a manner as to make it easily accessible Our new Catalog E tells you all. Have you one?

THE SANITARY COMPANY
CLEVELAND, OHIO

BE INQUISITIVE

INVESTIGATE EXAMINE CONSIDER

You have a right to know what you are buying—poor goods upset the best laid plans and are expensive. The best in the end is the cheapest.

THE IDEAL MFG. CO. DETROIT MICH.

THE IDEAL MFG. CO. DETROIT MICH.

The Ideal Low Tank Combination

stands the most rigid inspection—inside and out.

THE FINISH OF THE WOODWORK; THE CONSTRUCTION OF THE SEAT; THE STYLE OF THE TANK; THE BALL COCK; THE FLUSH VALVE; THE LINING, IN FACT EVERYTHING ABOUT AN *IDEAL LOW DOWN* BESPEAKS WORKMANSHIP AND INGENUITY.

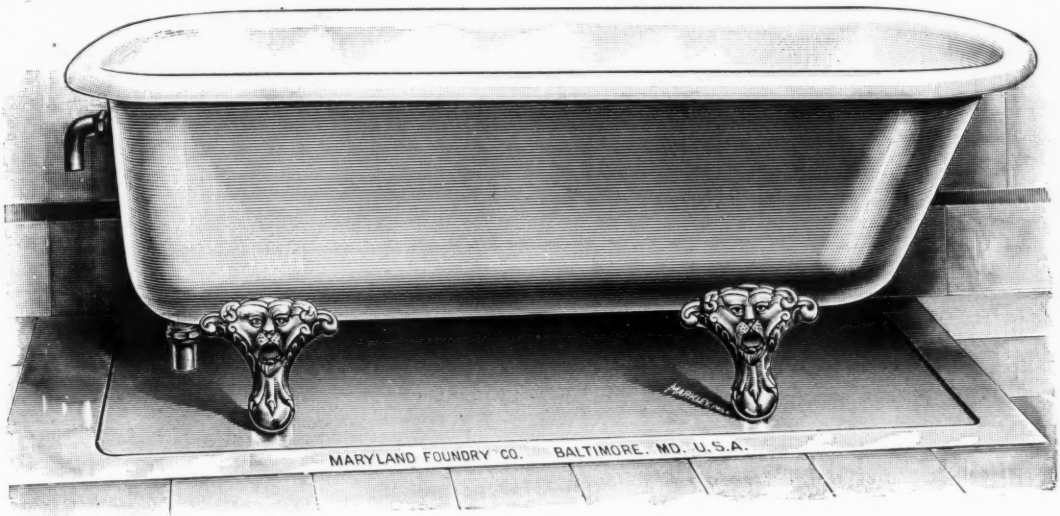
CORRESPONDENCE SOLICITED

THE IDEAL MFG. COMPANY
DETROIT, MICHIGAN

NOT IN THE TRUST

PRINCESS PORCELAIN ENAMELED BATHS

3 INCH ROLL RIMS

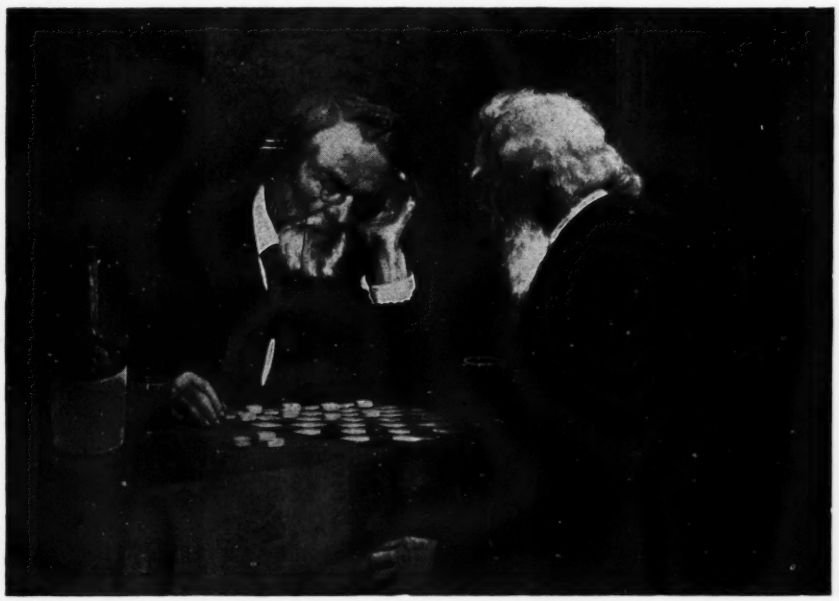


Nothing but the very finest of materials are used in the manufacture of these Baths. The iron is of the best quality and enamel is the purest, strongest and most durable that can be produced. Our prices are interesting.

A. WEISKITTEL & SON, BALTIMORE, MD.

MANUFACTURERS OF IRON ENAMELED BATH TUBS, LAVATORIES, SINKS, AND PLUMBERS' BRASS GOODS

THE AMERIGAN PROGESS ENGRAVING GOMPANY



MAKERS
OF
FINE
CATALOGUE
ILLUSTRATIONS

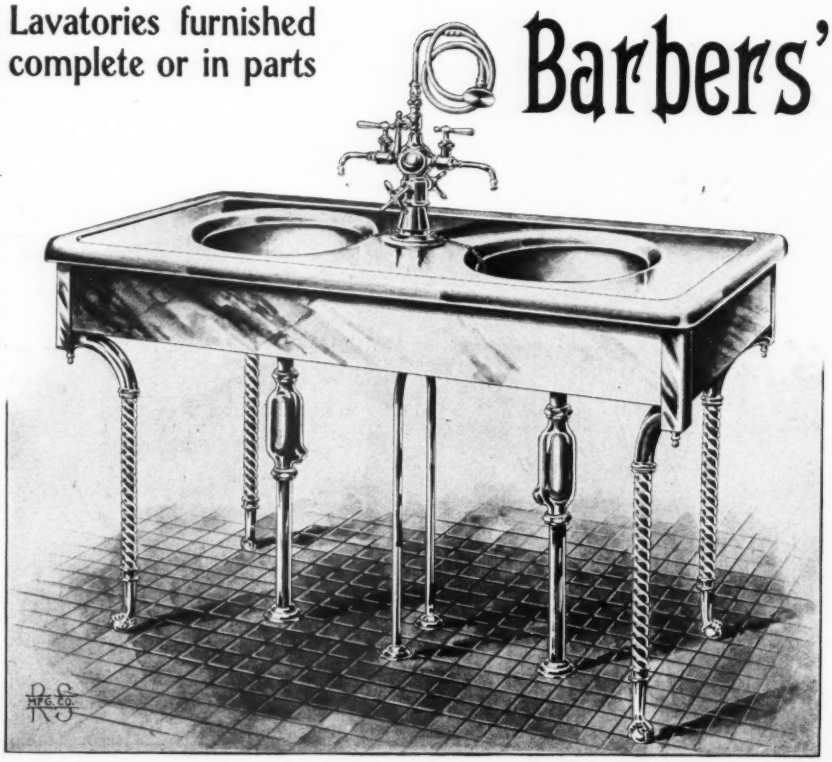
15 to 17 WEST SIXTH STREET, CINCINNATI, OHIO, U. S. A.

MONASH-YOUNKER CO.
CHICAGO-NEW YORK

We make the
Best
Steam Pressure Reducing Valves
Steam Traps
and
Automatic Radiator Air Valves
for the least money of any manufacturer in the world
Get our price before you buy

Lavatories furnished complete or in parts

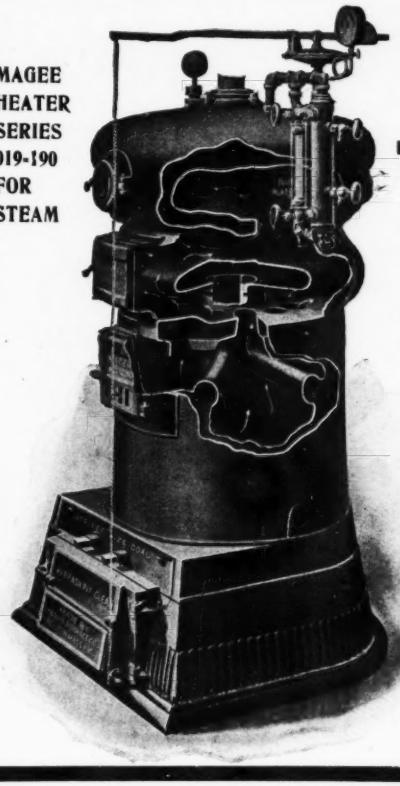
Barbers' Lavatory



Note the combination Fuller-Compression Shampoo Fixture. Made all Fuller pattern also for single bowl lavatories when wanted.

Rundle-Spence Mfg. Co.
Milwaukee, Wis.
Chicago Office, 52 Dearborn St.

MAGEE HEATER SERIES 019-190 FOR STEAM



SAME STYLE FOR HOT WATER ALSO

New Twentieth Century Heater

MANIFEST ADVANTAGES

Fire-pot and water tubes. Large, direct fire surface. Vertical circulation. Large flue areas assure a combining of the gases and full value of travel under slow combustion.

Note travel of dome (7 feet), simplisity of construction, and many more advantages.

WRITE US

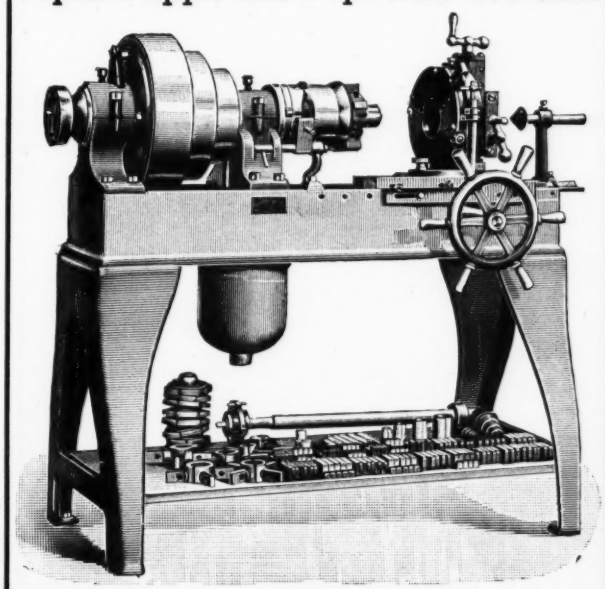
MAGEE FURNACE CO.

32-38 UNION ST., BOSTON

Steam and Hot Water Heaters, Warm Air Furnaces, Combination Warm Air and Hot Water,—Ranges, Stoves, &c.

LARGEST LINE UNDER ONE NAME IN THE UNITED STATES.

Apex Nipple and Pipe Mill Machine

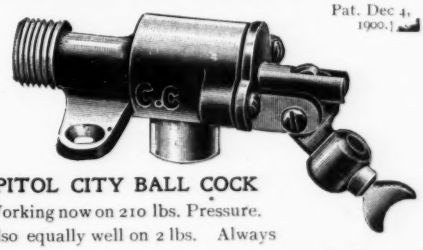


Will thread nipples thread to thread all sizes within range of machine.
Equipped with our Standard Adjustable Quick Opening and Closing Dies, allowing cutting off of pipe close to grippers.
Nipple grips can be closed on threaded end of pipe without injuring thread.
Only machine on the market with this feature.
Write for catalogue and prices.

MERRELL MANUFACTURING COMPANY

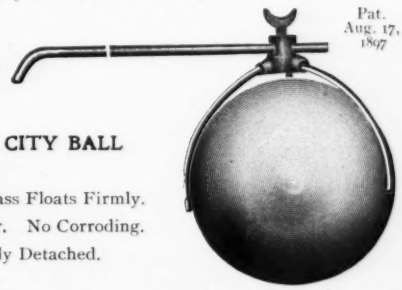
208 Curtis Street, Toledo, O., U. S. A.

Capitol City Ball Cock



CAPITOL CITY BALL COCK

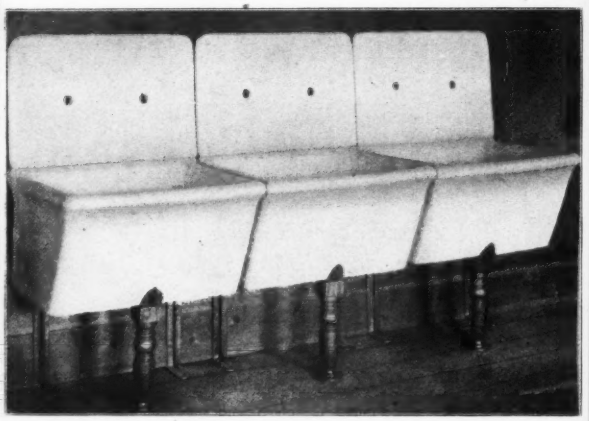
Working now on 210 lbs. Pressure. Also equally well on 2 lbs. Always Sure. Changeable Seat of drawn brass.



CAPITOL CITY BALL HOLDER.

Holds Glass Floats Firmly.
No Solder. No Corroding.
Ball Easily Detached.

O. H. JONES, Hartford, Conn.



Solid Porcelain Laundry Tubs

Made by the

American Porcelain Company

NEW BRIGHTON, PA.

Makers of the well known "Perfection" solid porcelain flat and roll-rim laundry tubs, kitchen and pantry sinks, lavatories, etc.

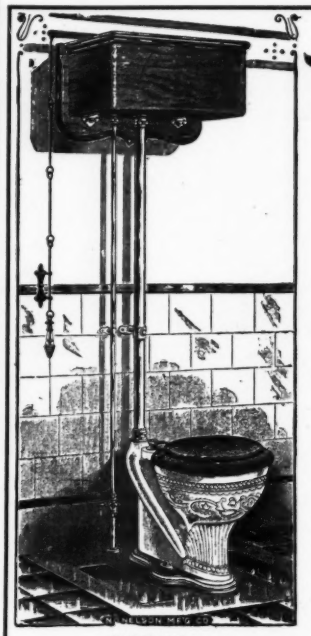


PLATE 315 C

Nelson's High Grade Syphon Jets.

The New "Dominion"

Double Jet
Polished Wood Work
Mechanically Perfect
Absolutely Guaranteed

N. C. Nelson Mfg. Co.

...PLUMBERS' SUPPLIES...

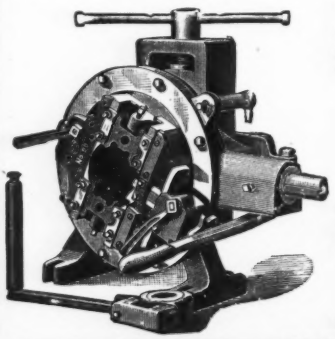
ST. LOUIS, MO.

MINUTES COUNT

When you have a "Rush" Job on hand 'tis then the virtues of

ARMSTRONG'S
WATER, STEAM AND GAS FITTERS
TOOLS

make themselves apparent.



They are made especially for Time and Labor—Saving and for Extensive Wear.

PIPE THREADING and CUTTING OFF MACHINES
HAND or POWER
capacity from 1-4 in. to 6 in.

PIPE WRENCHES
VISES
ADJUSTABLE
STOCKS and DIES

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Bathe Often AND Live Long

"The Perfection" Vapor Shower Bath

Is an Ideal Scientific Cleansing Apparatus

An active condition of the skin is absolutely essential to good health. A healthy skin will rid the body of all impurities and materially assist all the organs of secretion.

THE ONLY VAPOR AND SHOWER BATH IN ONE.

Simple in construction made of brass, highly nickel polished, suitable for the finest bath rooms; readily attached to any bath tub. The shower following the vapor bath closes pores of skin, prevents taking cold.

Unlike cheap sprays and shower rings, which do infinite damage by spraying the walls, floors and curtains, but is so constructed as to confine the spray within the tub. This shower bath alone is equal to any shower bath costing four times the cost of this. Patents granted 1901. Write for catalogue, guarantee and 15-Days Trial.

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GEM Hot Water and Steam BOILERS

EASILY AND QUICKLY SET UP
CAPACITY GUARANTEED

WE ALSO MAKE THE

ABENDROTH VERTICAL SECTIONAL STEAM AND WATER BOILERS

LONG AND FAVORABLY KNOWN TO THE TRADE EVERYWHERE

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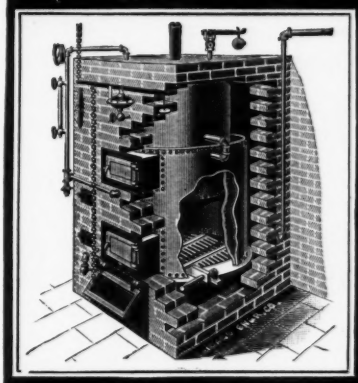

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forbids the purchase of three pumps when you can get ONE that will do the work of three.

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COMBINATION AIR, FORCE AND TEST PUMP

can be used for testing soil pipe, proving gas pipe, and is the best force pump on the market.

No stuffing boxes; all valves are on the outside, and work equally well with air or water.

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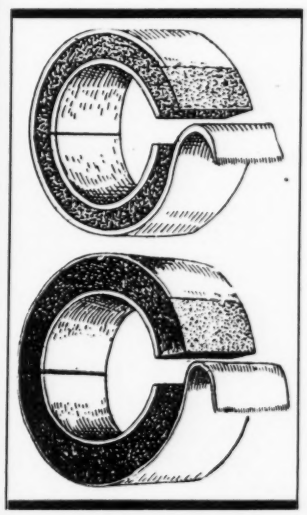
For High and Low Pressure Steam and Hot or Cold Water



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Yours truly,

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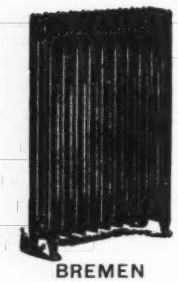

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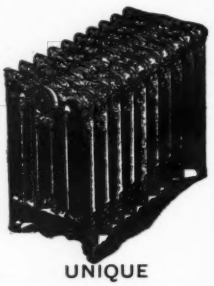

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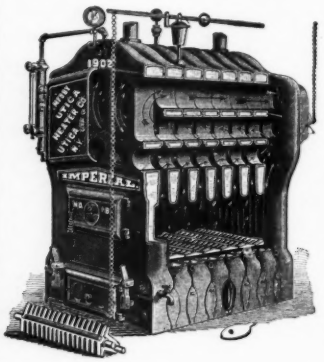
IMPERIAL

STEAM HOT WATER **BOILERS**



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It also assures a steady water line, the delivery of dry steam, and the absence of foaming.

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No Headers at Top or Sides
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"Low Down"

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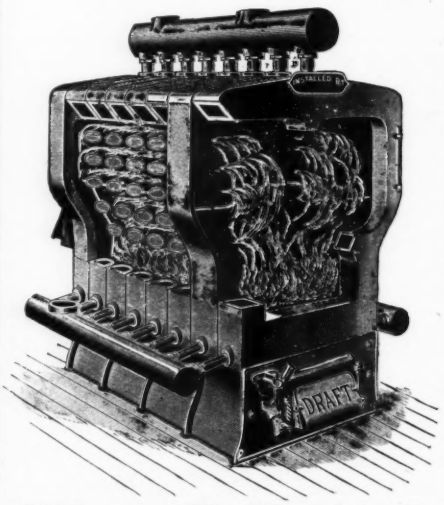

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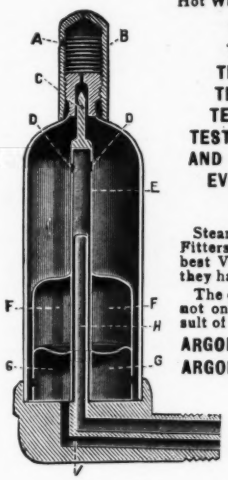

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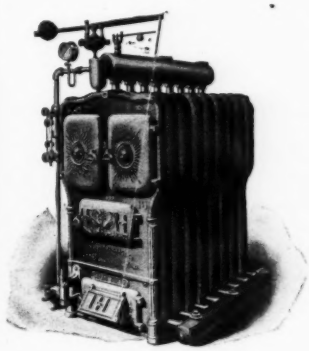

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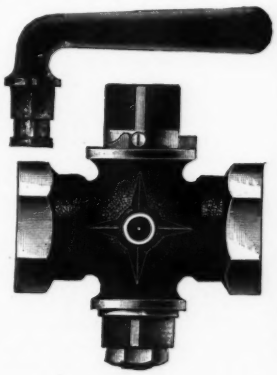

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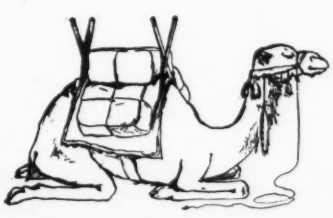

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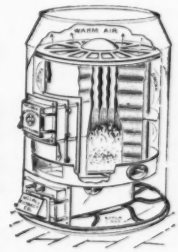

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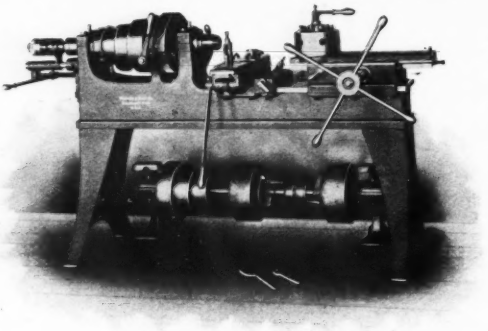

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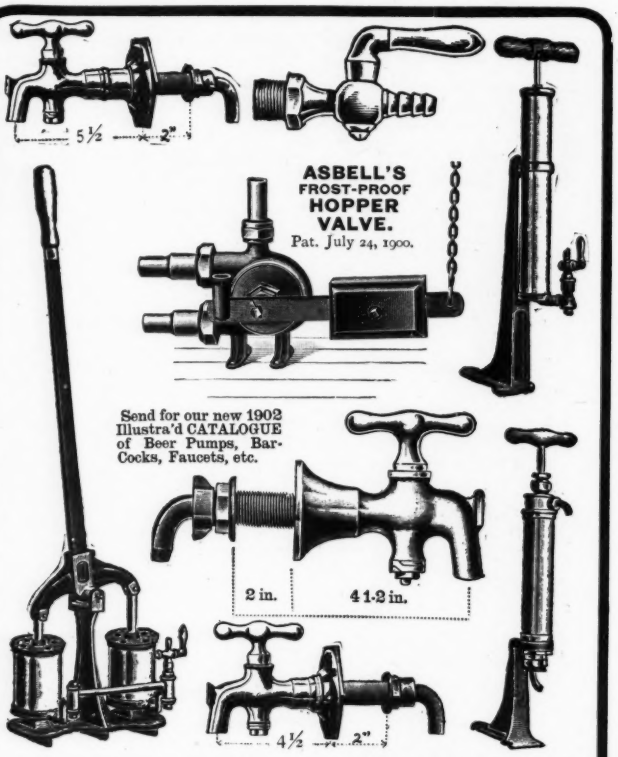

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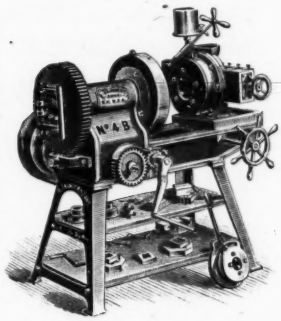

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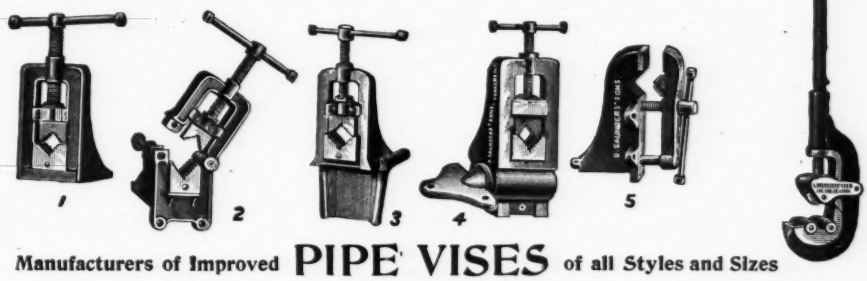

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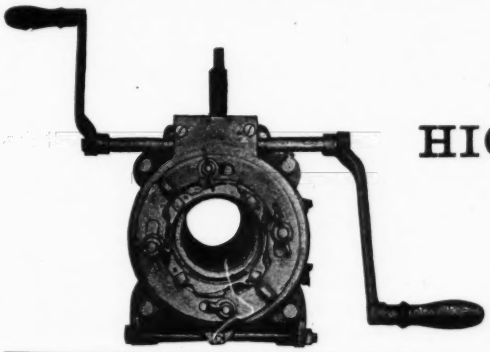

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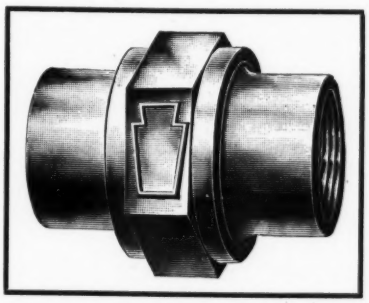

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Are Always Tight.

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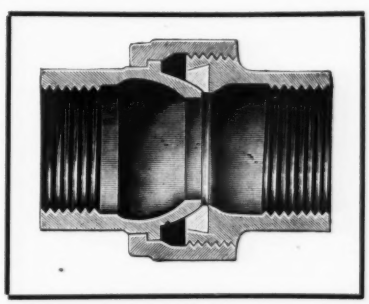

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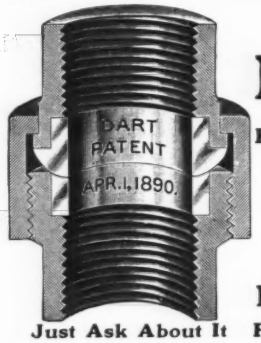

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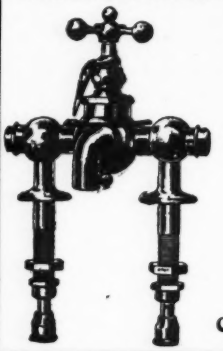

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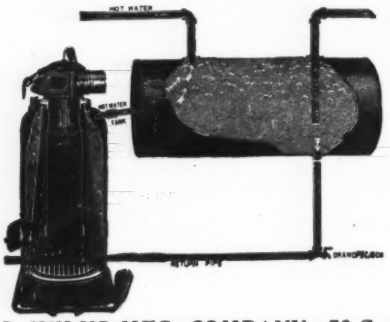

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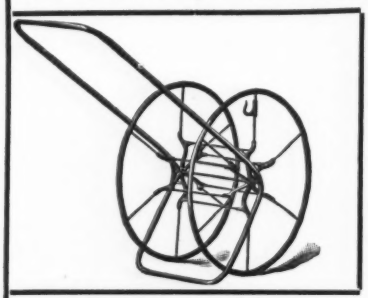

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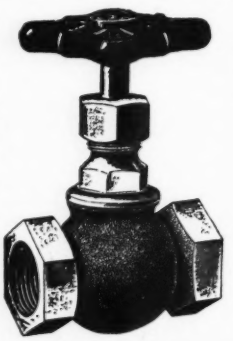

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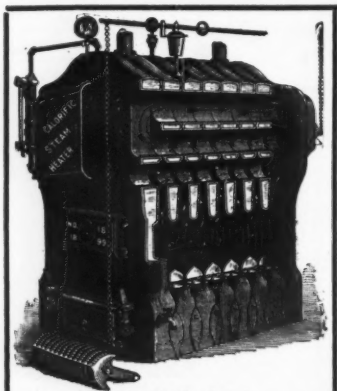

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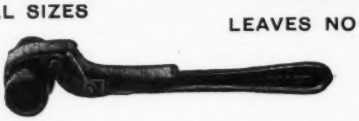

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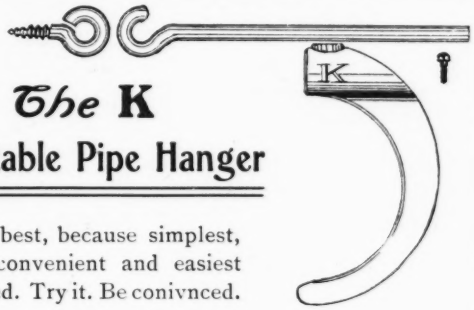

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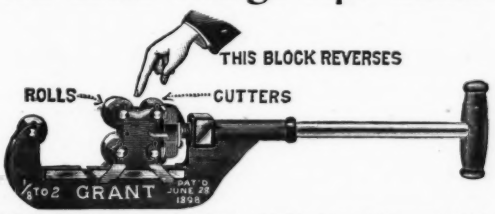

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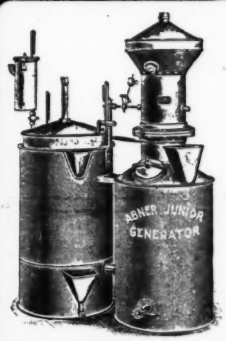

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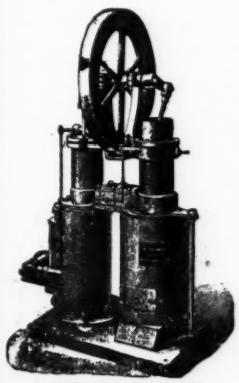

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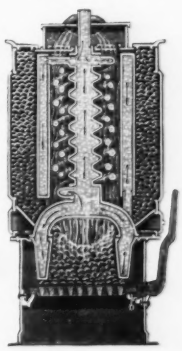

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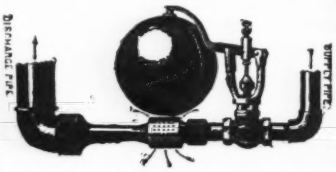

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Read what the Trade say;

"I am pleased to be able to highly recommend it after giving it a thorough trial. It certainly fills a long felt want, because it will fit any closet. It is simple, strong and durable and I have failed to find one leak after first putting it in place."

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Guaranteed to save 25 per cent in fuel. Official test places the saving at 25 to 60 per cent. Is entirely automatic and noiseless in operation. Has all the advantages of Hot Water Heating and none of its objectional features. Such a thing as an explosion is an utter impossibility. In case of breakage, no water or steam will escape in the room. This is the coming heat of the 20th century.

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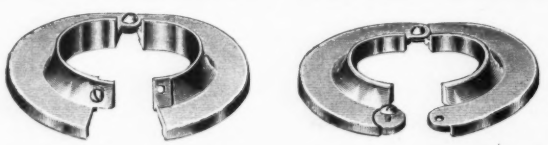

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This device is a **Specially Shaped Spiral Spring** made from **Crucible Steel** wound tapering to one end so as to be easily withdrawn, and having a loop at the other to hook into when the bend is to be made in a long piece of pipe. The Bender placed inside of the pipe, supports and prevents the pipe from flattening or collapsing while being bent. By the use of it lead pipe, and copper, brass or steel seamless tubing may be quickly and easily bent. It is as easy to form opposite or double curves, such as goose necks, as a single bend.

We carry in stock ¾, 1, 1¼, 1½, 2, 2½ and 3 inch Benders.
Special sizes on demand.

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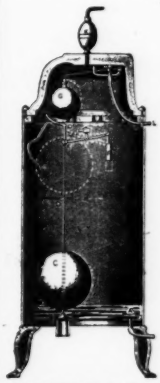

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Used by Burrows Light Company and Koch Consumption Cure Co.
The most popular pump in Philadelphia for drawing beer.

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Freight allowed on the Adjustable Fittings, East of the Mississippi river, on a dozen of one or assorted sizes.

Sample Fitting will be Sent on Application.

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BOTH BOILERS GUARANTEED NOT TO LEAK AND AGAINST COLLAPSE

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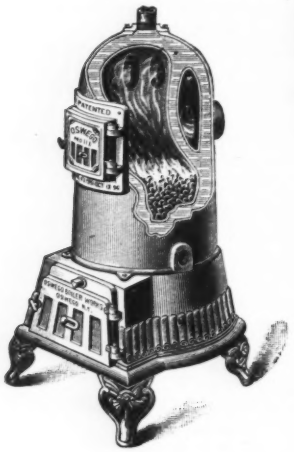

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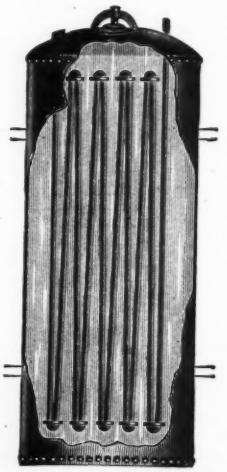

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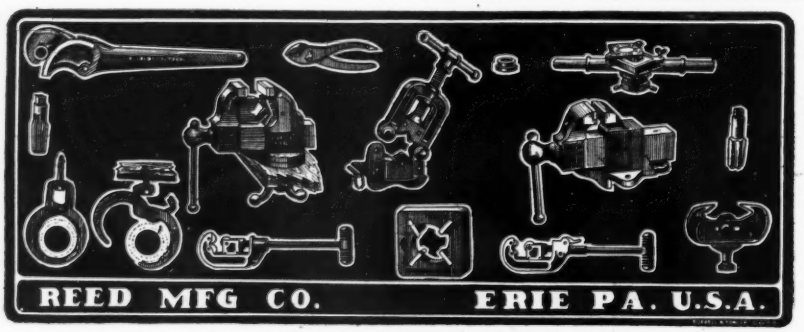

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The Nearest Approach to Sunlight and Almost as Cheap.

ARC ILLUMINATORS 750 CANDLE POWER. 7 HOURS TWO CENTS.

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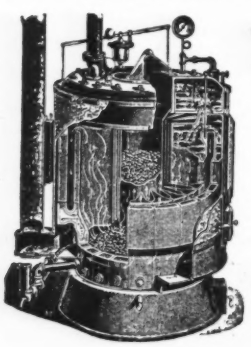

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How coal is wasted up a flue. We guarantee the **"ROBERTS"** to be the most economical and easily managed boiler on the market. Will not such a boiler get you further orders?

We also make the **"CHARMER"** for medium size work, and the **"MILTON"** for large buildings, both square boilers.

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The Webster Feed-Water Heater and Purifier

prevents this waste of 15 per cent and saves 6 to 10 per cent more, besides preventing delays and accidents.

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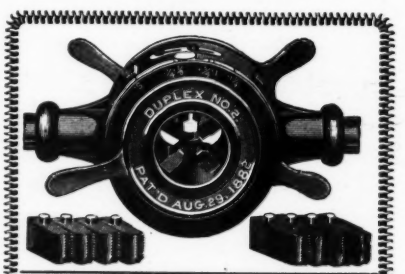

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Always ready for instant use.

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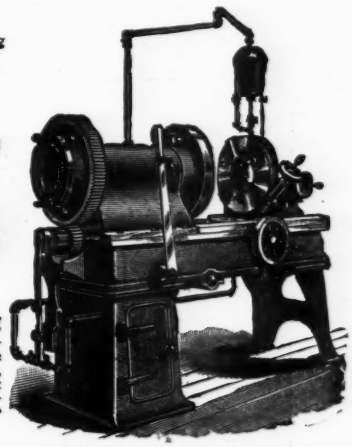
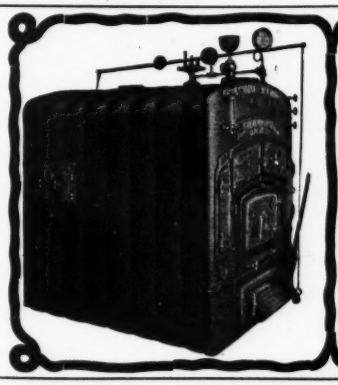
Pipe Threading and Cutting Tools Write for catalogues showing the most complete line of ⅛-inch to 16 inches for Hand, Belt, Engine, and with Electric Motor Attachment. We can furnish Bolt-Threading Attachments for these machines.





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For Steam or Hot Water

Made in Thirty-One Sizes

From 350 to 4,000 sq. ft. radiating surface

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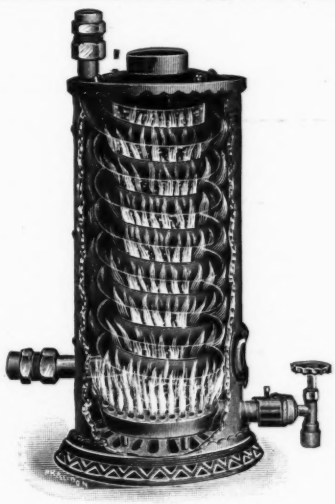

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Is infinitely better than red or white lead for making steam, gas or water pipe joints. Joints will be tighter, and can be broken months or years after without damage to pipes or tools. IT WILL PAY EVERY PIPEFITTER TO SEND FOR SAMPLE AND CIRCULAR.

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Prices will interest you

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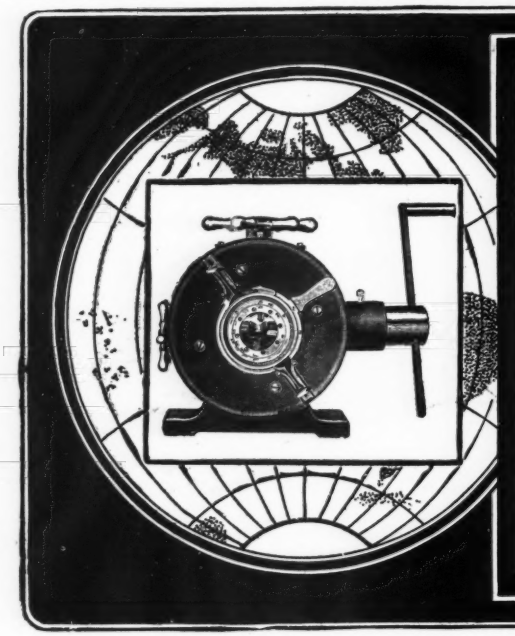
Write Today McVay & Walker Braddock, Pa.



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no machine is better made or more perfectly meets every requirement than the OSTER PIPE THREADING MACHINE. For hand or power. Does its work easily, quickly and accurately.

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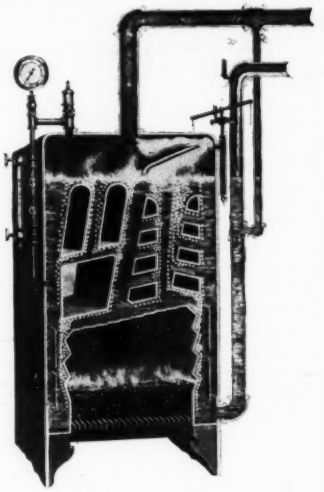

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COLUMBIA HEATING COMPANY
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Hundreds of our customers have furnished voluntary testimonials.

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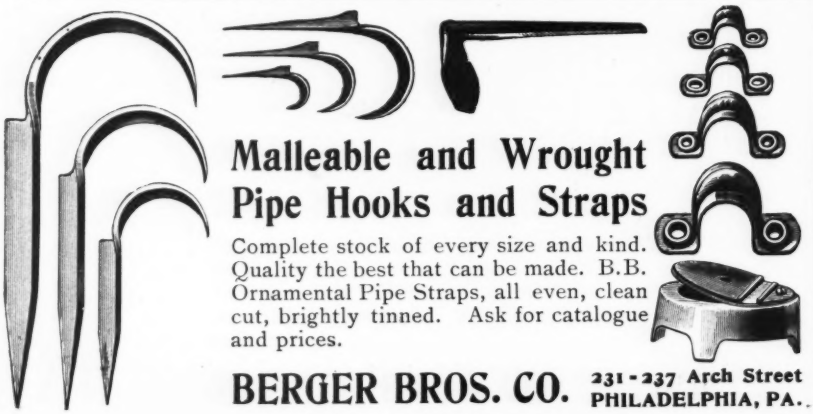
THESE COVER THE FIELD, DO THEY NOT?



Malleable and Wrought Pipe Hooks and Straps

Complete stock of every size and kind. Quality the best that can be made. B.B. Ornamental Pipe Straps, all even, clean cut, brightly tinned. Ask for catalogue and prices.

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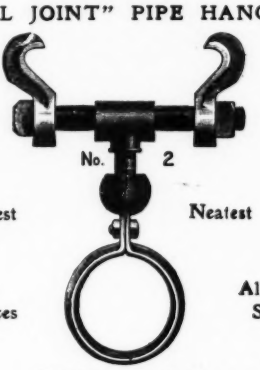
"BALL JOINT" PIPE HANGER



Strongest Neatest
All Sizes All Styles

Manufactured only by
THE PENN ENGINEERING CO.
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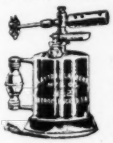
Points Worth Considering

when buying a torch are safety, convenience, durability and economy in the consumption of fuel. (You buy fuel all the while.)



The No. 2 Torch is well made, is strong and durable. The burners are powerful, and the saving of gasoline will soon pay for the torch. Try it. *Your money back if it doesn't please.* Jobbers sell at factory price, or we will ship by express upon receipt of $3.00.

$2.50 NET.

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BOSS WASHER

TAKE NOTICE

No Boss Washers are Genuine that do not have the inventor's name "ANDREW BELL" on Label of box.

Samples sent by Mail

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McCANN Back Water Valve

is the simplest and best valve on the market, can be set in place in five minutes without breaking basement floors or sewer

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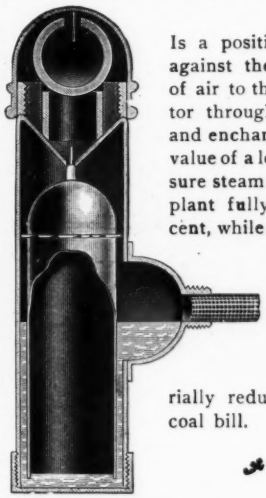
TWENTIETH CENTURY AIR AND VACUUM VALVE



Is a positive seal against the return of air to the radiator through itself, and enchances the value of a low pressure steam heating plant fully 50 per cent, while it materially reduces the coal bill.

MORGAN & COMPANY

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Use "Chicago Air Valves"

OTHERS DO, WHY NOT YOU?

IN THE AUTOMATIC CONTROL OF RADIATORS AND STEAM COILS FOR HEATING, THE USE OF THE "CHICAGO SYSTEM OF AIR VALVES" LEAVES NOTHING TO BE DESIRED.

A careful inspection of this cut will prove conclusively that our valve is equal and in fact superior to any valve put to the same use. No syphon tubes, double apertures in nipple or other delusory features about the "Chicago Valves." Write for illustrated booklet "About Valves."

Guaranteed

The Chicago Air & Water Valve Co.

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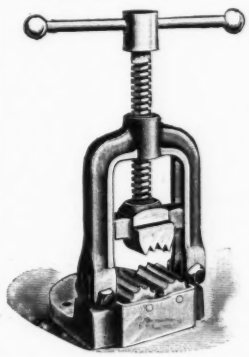
Keystone Malleable Pipe Vise

(PATENTED)



No. R, holding Pipe	⅛	to	2	inches.
No. R, R, "	"	"	¼	"	3	"
No. S, "	"	"	½	"	4	"
No. T, "	"	"	2	"	6	"
No. U, "	"	"	6	"	12	"

LIBERAL DISCOUNTS TO THE TRADE.

Equipped with Roller Jaws which are a sure grip, will not mar the pipe and will outlast three or four sets of V Jaws.

This Vise is a Cracker Jack for the Money. Manufacturers of Pipe Vises (ourselves included) have been slow in not getting on to fluted rollers for pipe jaws years ago.

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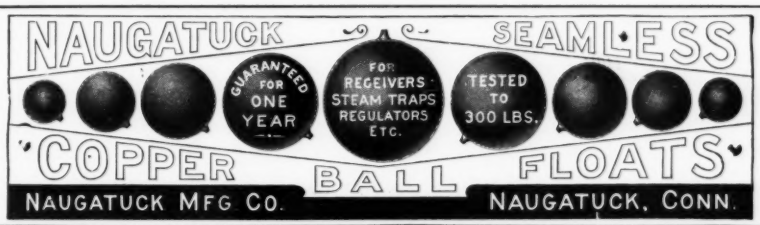

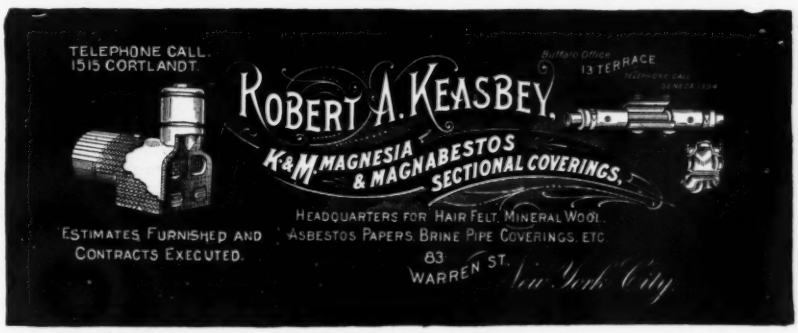
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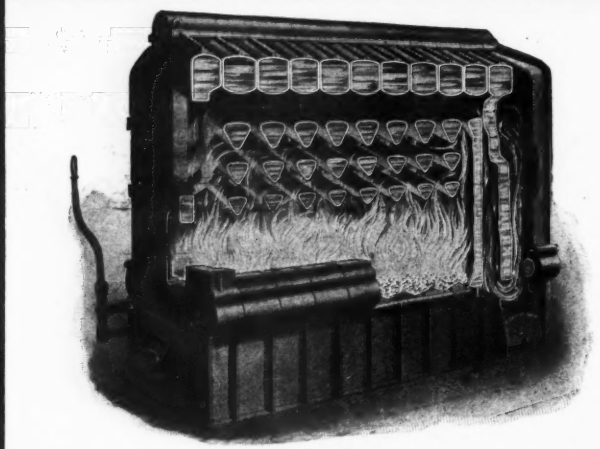

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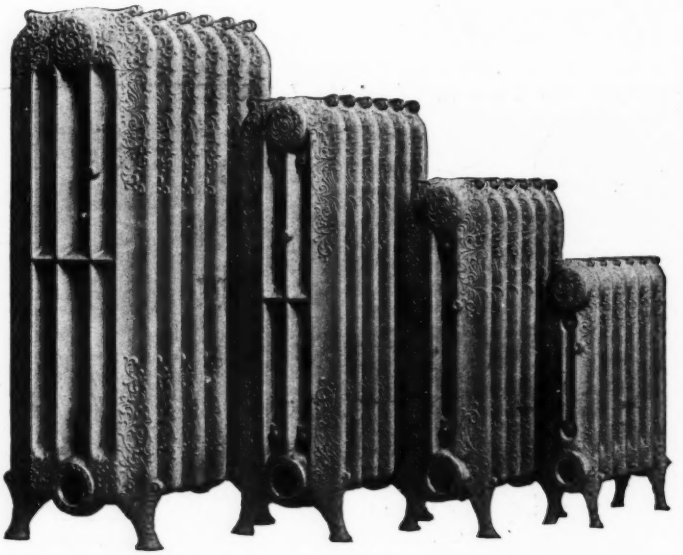

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Whole No. 150 *APRIL FIFTEENTH, NINETEEN HUNDRED AND TWO* *Vol. 23, No. 1*

Plumbing and Household Sanitation—XX.

A Course of Lectures which, when completed, will cover the theory and practice of the art

By J. Pickering Putnam, of Boston, Mass.

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Copies of issues of Domestic Engineering containing the twenty previous installments may be had at 20 cents each.

Sanitary Engineers.

Not very long ago I passed a small plumber's shop having a large show window. There was room enough in this window to display a handsome and instructive system of sanitary appliances, arranged in such a manner as to inspire the beholder with a sense of wisdom and skill of the proprietor. The exhibit in this window, however, consisted of three huge pan water-closets in a row, extending from one side of the window to the other, with a few antiquated basin faucets, plugs and chains lying on the floor at their feet. The sign above read, "Sanitary Engineer."

We deplore the ignorance of the public in insisting upon having such unsanitary fixtures; but how can we expect anything better of them, so long as professors of hygiene themselves thus recommend them with triple emphasis and to the total exclusion of what is really good!

Mr. Hellyer, in his "Sanitary Plumbing," gives us a copy (Fig. 251) of a plumber's sign in London, quite similar in effect to the one just described, for you see this man

X. Y. Z.,

BUILDER, PLUMBER, PAINTER,

Glazier, Carpenter,

RANGE AND STOVE MAKER,

Hot Water Engineer,

PUMP MAKER and SANITARY ENGINEER.

WATER-CLOSETS FIXED ON THE *NEWEST* PRINCIPLES.

WRITING, GRAINING, MARBLING.

Fountains Erected.

UNDERTAKER.

FIG. 251.

also called himself a "sanitary engineer," in spite of the fact that he had placed a pan closet and a D trap on one side of his business card, and a combined water-closet tank and drinking water cistern on the other.

In preparing this sign for our purpose I added the word "undertaker," knowing that one who claimed so much with so little equipment would be likely to have to bury his employers as his final act of service in their behalf.

As Mr. Hellyer wisely says, such signboards should rather be taken as "warning boards," in order that he who readeth may run away.

Valves and Plunger Closets.

A few years ago, before the need of systematic ventilation of the sewers and soil-pipe began to be felt, and back pressure from the foul sewers forced the sewer gas through the water seal of traps in bubbles, a tight-fitting valve or plunger was felt to be needed in water-closets, and as these closets were at first built without overflows, the valve or plunger did actually seem to perform a real service.

Now, however, the circumstances are altered. It is found that an overflow is necessary in these closets, and this overflow passage is rarely provided like the trap with a valve or other mechanical closure. Hence, any gases which could pass an ordinary water seal could pass through these closets by way of the overflow passage quite regardless of and quite

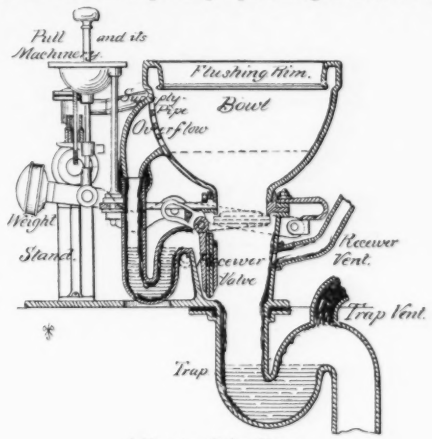


FIG. 252. Valve Closet.

as easily as if the valve or plunger in the trap never existed. Moreover, the ventilation of the sewer and soil pipes renders back pressure comparatively harmless, so that the only possible useful office of the valve or plunger is no longer called for.

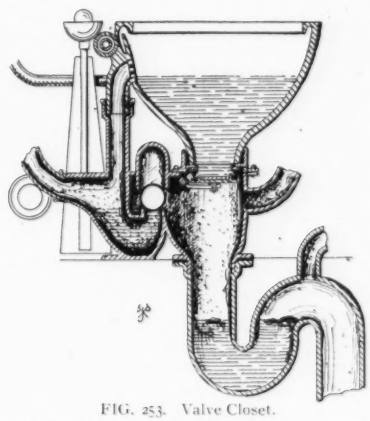


FIG. 253. Valve Closet.

The same objections to the mechanical seals of water-closet traps which have been described for the smaller fixture traps hold with even greater force with water-closet traps. They cannot be made permanently tight and effective.

The only object of the valve or plunger, therefore, is to retain a certain quantity of water in the bowl to receive the

waste matters, and prevent their striking the dry surface of the closet bowl, to which they would adhere, and as this result can now be accomplished equally well without them, and by simpler means, it is obvious that they are utterly superfluous.

The efficiency of the large body of water suddenly emptied from the bowl for flushing out the water-closet and pipes forms a good point in these closets, but it is sometimes partially negatived by the obstruction of the valve and plunger themselves when they are but slightly raised in use or defective through rust and sediment. But this function is equally well performed by simpler and better closets.

The receiver or container of the valve and plunger is open to the same objections as that of the pan, differing only in degree, and the overflow passage, not required in the pan-closet, forms a second filth collector, and increases the complexity and cost of the apparatus. The sudden discharge of the larger body of water in the bowl is very liable to empty the trap below by its momentum and siphon action, requiring a special provision for its automatic refilling.

These and other considerations have led sanitarians to differ as to the relative merits of the pan, valve and plunger closets, though there seems to be no sufficient reason for such difference. Therefore it is important to analyze the types sufficiently closely to permit of an independent judgment as to them, and though their use is becoming daily more limited, they are still seen in vast numbers, and must be well understood if only to be better informed as to why they should avoid them.

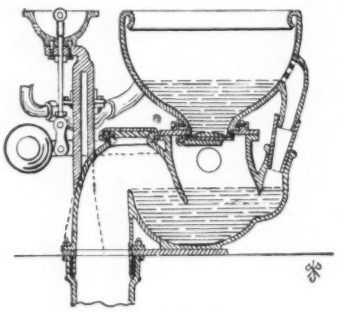


FIG. 254. Valve Closet

The Valve Closet.

Valve closets are those which have the outlet of the bowl closed by a movable valve or plate, usually held in place by a lever or spring. Fig. 252 represents a valve closet having the trap below the floor. Fig. 253, a valve closet with a ball in the overflow. These and the type in which the trap is placed above the floor, Fig. 254, are among the simplest and best of their class, and may be considered as types or standards. All others differ from these merely in slight and comparatively unimportant details. Some valve closets are made without any water trap at all below the valve. These are totally unreliable because no valve has as yet been discovered which is not liable at some time to leak, especially when used in water-closets. Beginning, as before, with

The Flushing.

We see, by examining the drawing, Fig. 252, that the cleansing effect of the stream can never reach those parts of the receiver which lie behind the valve and around its hinge, nor any part of the overflow passage. Hence, these parts are sure, sooner or later, to become foul, and they are exactly the parts in which foulness will impede the proper working of the valve and closet, and occasion leakage of the water from the bowl. The receivers of both the pan and the valve closets can be enameled and provided with special cleansing jets, and closets having these improvements have been manufactured, but the overflow passage cannot be so scoured, and I know of no closet in which the attempt to do so has been made. Finely divided waste dissolved in the water and making its way into the overflow passage, as it very frequently does and must soon, fouls it, and once the deposit has begun it cannot be arrested except by taking the closet to pieces. The extent of surface which *cannot* be reached by special scouring streams is, therefore, greater in the valve than in the best pan closets, and this goes far to offset the advantage it has in the smallness of its receiver.

(b) The valve, like the pan, breaks the force of the flushing stream from the cistern due to head and thus prevents its passing through the receiver and trap in a compact vol-

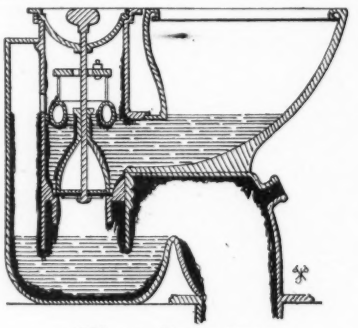


FIG. 255. Plunger Closet.

ume, occasioning a total loss of the advantage the water head from the cistern might give and in the better types of closets does give. Here again the valve and pan closets are equally defective.

(c) The same causes for the production of disagreeable noises in flushing exist in both kinds of closets. Most valve closets are superior in workmanship, as well as in price, to the pan closets, but so far as *principles* of construction are concerned, the valve closet has no superiority over the pan.

(d) To operate the machinery of a valve closet requires more strength than is the case with the pan. It is indispensable that the valve press very firmly against its seat in order to retain and sustain the large body of water in the bowl above it, while no such pressure is evidently required in the pan. To overcome this greater pressure a greater effort is required, so that in this respect the valve closet stands inferior to the pan.

(e) In the matter of complication of arrangement for the simultaneous opening of the closet and cistern valves through levers, cranks and wires, the valve and pan closets are evidently equally defective.

(f) When the water-closet is used as a slop hopper, and a large volume of water is suddenly emptied into the bowl, the obstruction occasioned by the valve to the outflow of

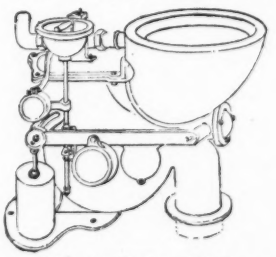


FIG. 256. Plunger Closet.

the water is likely to cause spattering, while the pan, on the contrary, though it forms an obstruction, allows the water to escape in a measure as it is poured in, and the danger of spattering and overflowing is thereby somewhat diminished. The valve closet overflow affords less of a security in this respect. Hence, here again the valve closet loses in comparison with the pan. When, as often happens, the valve is suddenly closed at the moment the waste matters are passing out, and catches these matters, it presses them against the valve-seat, whence they can never be removed by flushing, but remain to decompose until they are scraped off with

great difficulty. The same objection holds with the pan closet, but such an obstruction on the valve causes it to leak, and as soon as the water has escaped from the bowl the odor of the adhering matters becomes intolerable. Thus once more superiority must be granted to the principle of the pan closet over the valve.

The form of the valve closet is (a) complicated by the overflow not required in the pan closet. In other respects, the machinery of the closets is similar and all this complication unnecessary to closets. (b) The trap and receiver are invisible and inaccessible from the outside, like those in the pan closet. (c) As is the case with the pan, there is nothing in the mechanism of the valve closet to provide against the loss of its water seal through evaporation, siphonage, etc. It has been proposed to ventilate the receiver with a special vent pipe to carry off the odors generated therein and protect the trap below from being unsealed by the momentum of the water discharged by the valve. But a single pipe would not be sufficient, because an exhaust as well as a supply pipe would be necessary to create a movement or change of air, and this would add enormously to the expense. Were there no receiver these two pipes would not be required. (e) The valve closet is equally defective with the pan in requiring a frame around the closet to protect it and receive the weight of the seat. (f) The valve mechanism is more complicated in construction than the pan. It requires a very carefully turned seat and a rubber packing which is very perishable. Hence repairs are necessary even oftener than with an equally well made pan closet.

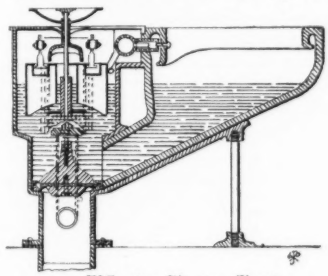


FIG. 257. Plunger Closet.

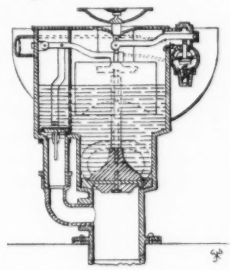


FIG. 258. Plunger Closet.

The cost of manufacture is evidently considerably greater than that of the pan closet, on account of the overflow and of the principle of the valve, which requires both greater strength and delicacy of form and adjustment. It is correspondingly more liable to get out of order, and hence is more expensive to keep in repair.

Deductions.

Thus we find in the valve closet every defect of the pan and at the same time others which are peculiar to itself. Both have their hidden "chamber of horrors," which exhale noisome odors into the house at all times, and more particularly when their machinery is operated. The cesspools become perpetual automatic gas retorts and defeat their own object of removing all organic decomposition immediately from the premises.

The Plunger Closet.

Plunger closets are those which have the outlet closed by a plunger or plug fitting over or into it, and held in place by its own weight.

Figs. 255 to 259, inclusive, represent plunger closets having a solid plunger, the overflow passage being in the rear behind the plunger.

Fig. 260 is a hollow plunger closet, the overflow being through the plunger itself. This is the simplest form of plunger closet, but it allows effluvium from matters which may be left floating in the trap to escape into the room through the plunger and around its handle.

Figs. 257 and 258 show a plunger closet having its overflow trapped with a plunger or valve. It is the only plunger closet except the Jennings which has a mechanical seal for the overflow, and the only closet in which the overflow cannot be destroyed by siphonage. The complication arising from the mechanical trapping of the overflow and the enormous size of the receiver form serious objections to this form of closet. Were there no better and simpler mode, however, of preventing the action of siphoning in water-closets, it would stand high in spite of the inherent defects of its class.

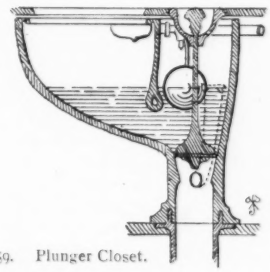


FIG. 259. Plunger Closet.

Figs. 257, 258 and 259 represent the class of plunger closets which has a chamber or cistern for the supply cock and regulating float connected with the plunger chamber. This form of closet is very objectionable. The float chamber becomes foul like the plunger chamber, and the two chambers together then form a species of cesspool even worse than that of the pan closet.

The above may be considered types of all known plunger closets. Some are made without water traps under the plunger, but these, like trapless valve closets, are totally unreliable. In regard to

The Flushing.

We find here a much larger extent of surface of receiver which never receives a scouring of water than in the valve closet. The flushing stream passes under the plunger receiver, and not through it as it does through the valve receiver. The plunger receiver must also from its nature be larger than that which is sufficient for the valve.

These two circumstances render it much more easily fouled.

To operate the machinery of a plunger closet requires still more of an effort than is the case with the valve, because the dead weight of the plunger has to be lifted direct without the aid of the leverage of the crank which is employed with the valve. The weight of the plunger must be sufficient to retain the water in the bowl by its pressure against its seat.

In all other respects the flushing of the plunger closet is attended with precisely the same defects as that of the valve closet.

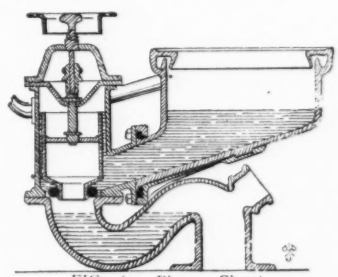


FIG. 260. Plunger Closet.

The same criticisms which are applicable to the valve closet in relation to its form, material, construction and cost apply with equal force to the plunger closet, and the same

Deductions

may be made in its comparison with the common pan closet, i. e., it is superior to the ordinary flimsily made pan closet, but greatly inferior to its most improved and solid construction, and, in general, it is inferior to the pan closet in the principle of its construction and operation.

Sanitary Betterment in Great Britain.

A review of the history of the sanitary movement in the British Isles.

FROM the proceedings of the recent session of the Institute of Sanitary Engineers of Great Britain we reproduce the following excellent review of the growth of the sanitary movement in England. The matter was thus ably presented by the honorable president of the society, Dr. John C. Thresh, a celebrated authority on sanitary matters and member of several distinguished bodies charged with the public health. His report contains much which will prove of interest and benefit to those who have at heart the cause of better sanitation. In his opening address the president spoke as follows:

GENTLEMEN:—The delivery of an opening address is the time-honored duty of a president, a duty which cannot be ignored by any one elected to fill such a responsible position, if he really has at heart the interests of the association over which he presides. The choice of a subject is always one of difficulty, not because the number to select from is limited, but usually because subjects are so numerous. This is especially the case when the institution or association is interested chiefly in sanitation. As its name implies, the Institute of Sanitary Engineers is one of these, and I venture to say one which, from its aims and objects, must take a foremost place among such societies. The enterprise exhibited by your council is evidently inspired by this laudable ambition, and its success will not only be for the benefit of the members of the Institute, but of the public generally. The numerous associations interested in public health, all flourishing, and all founded within comparatively recent years, indicate the great importance now attached to this subject. The late Lord Beaconsfield appreciated this when, at the commencement of an electoral campaign, he said: "In my opinion, the great question, the great social question which should engage the attention of statesmen, is the health of the people. It refers to all subjects which, if properly treated, may advance the happiness and comfort of men." I am afraid there are many statesmen who do not as yet fully realize the importance of public health, and, notwithstanding the influence of the numerous sanitary associations, there is a great deal of ignorance to be dispelled and of apathy to be overcome. These results will be effected in time. The reports of medical officers of health are showing what are the conditions which prejudicially affect health, the sanitary inspectors are actively engaged in detecting these conditions, and it falls to the lot of the sanitary engineer to remove most of these dangers to the public health by devising and carrying out works of sanitary improvement.

Although your Institute was born at the close of the nineteenth century, sanitary engineers existed long prior to that date. There were men eminent in the profession more than 2,000 years ago. The ancient Romans advanced to such a stage of civilization as to recognize the importance of general cleanliness, and the necessity for removing filth from the proximity of their dwellings. This is proved by the immense works their sanitary engineers constructed in order to supply towns with water and to carry away the sewage. The remains of their aqueducts and sewers in and near Rome still remain to excite our wonder and admiration. Even the modern water-closet is only an improvement on a Roman creation. In the ruins of Pompeii there was found in the corridor of one of the theaters "a retiring place for necessary occasions where the pipes to convey the water and the basin like that of our water-closet (1775) still remain, the wood only having moldered away with time." But an eruption of Vesuvius destroyed Pompeii, and eruptions of barbarians from the North destroyed Rome, and with it its civilization. The aqueducts were thrown down, and the water spreading over the plains formed marshes which contributed greatly toward rendering uninhabitable the surrounding country, and for ages rendered Rome malarious. Laucisi says: "The aqueducts existing no longer, the sewers and privies were alike neglected and produced serious and frequent sicknesses which were more effectual in destroying the population than the arms of the barbarians. The air became so vitiated that plagues and fevers of a malignant character continually carried on their ravages."

When the Romans invaded Britain, probably London was the only town consisting of a close aggregation of houses which existed in this country. What have been called towns were usually fortresses or camps of refuge and not places of residence. The Celts, like the Germans, "could not endure that one house should but upon another, or that there should be raised among themselves streets of houses after the Roman fashion." The sites selected for aggregates of houses were situations where water was easily obtainable from springs or shallow wells, hence we find the oldest towns and villages on gravelly subsoils. At a very early stage in civilization some form of privy would be erected and used for decency's sake, and the excreta would be deposited in the same subsoil in which the wells were sunk. This is a condition of things which you will find unfortunately still exists in many parts of this country. Fluid matter easily percolated into the porous soil, polluting it, so that the solid matter left did not require frequent removal. As houses became more closely aggregated, the whole ground upon which these villages stood became saturated with filth, poisoning the soil, water and air. After a time, either because of the nuisance created, or the refusal of the soil to absorb the fluid filth sufficiently freely, trenches were cut to carry it away either into a water course or some form of cesspool. In the Middle Ages the filthy condition of our towns was almost beyond conception. The air reeked with the effluvia from the polluted ground, from these open ditches or sewers, and from heaps of ordure. The poorer classes were crowded like swine into hovels which we should now condemn as pig-sties. Plagues and pestilences occurred every few years, and the mortality at all times was simply frightful.

Other countries seem to have been in much the same condition. Thus, Mons. Villerini, writing of the condition of Paris in the fourteenth century, says: "The horrible filth of the streets was insupportable, so much were they incumbered with dirt of every kind. In 1388 an ordinance of Charles XII. says, 'And whereas the pavements of Paris are much injured and fallen into decay, the town has long been, and still is, full of dirt, rubbish and ordure, which each person has left at his own door, so that it is a great horror and a great scandal and shame to the city, and a great grief and prejudice to the human beings dwelling in and frequenting the city, who by the infection of the stinking mass of filth have fallen in times past into great illness and infirmity of body and great mortality.'"

In the Middle Ages epidemic diseases carried off the inhabitants of these islands in multitudes. For example, the outbreak of plague in 1625 appears to have caused over 35,000 deaths in London alone. Unfortunately, no proper records of births and deaths were kept; but certain returns for London are available for that year. These show that the number of christenings was 6,983; the number of burials was 54,625; the number of deaths attributable to plague, 35,417. Apart from the plague, however, the proportion of burials to christenings shows an enormously high mortality.

In the earliest records of these recurring plagues and pestilences, it is noticed that their most deadly effect was produced in the filthiest towns, and in the filthiest portions of towns, and many efforts were made to effect improvements; but the gross ignorance of the people, and the general belief that epidemics were sent by God, and that it was useless to contend against them, induced a condition of apathy which it has taken centuries to shake off. Even in 1830 an attempt on the part of the municipal authorities of Paris to introduce a more effectual method of cleansing the streets and removing house refuse led to a serious riot, which was not quelled until blood had been shed, and which caused the improvement to be abandoned. This actually occurred during an epidemic of cholera. The plague, they said, was due to the poison produced by the frequent removal of the filth.

In this country we have authentic records of the condition of our towns and villages during the first half of the present century; and it was during this period that the more exact relationship between filth and disease was being studied. After the first epidemic of cholera Parliament began to take an interest in the sanitary condition of the country, and various commissions were formed. In 1842 appeared the report on the "Sanitary Condition of the Laboring Population," by a royal commission. This report is epoch-making, since with it appeared the dawn of the sanitary era. A few brief excerpts from this report may be of interest:

Take first the royal borough of Windsor. Here the commissioners found open stagnant ditches from which an intolerable stench was perpetually arising, producing fever of a severe character (typhus-typhoid). The openings of the sewers were exceedingly offensive in hot weather; the town was badly supplied with water, and the drainage in the highest degree defective.

At Tiverton the inhabitants of certain parts of the town were easily distinguishable, since all had a miserable and sickly appearance. The open drains in some cases ran immediately in front of the doors of the houses, and some of the houses were surrounded by wide open drains full of all the animal and vegetable refuse not only of the houses of that part, but of those in the other parts of Tiverton. In many of the houses people were suffering from "fever." At Stockport there were many houses without yards or conveniences. Many families lived in damp, dark cellars. Filth was thrown into open gutters in the street. There was scarcely a house in some districts which had not been affected with fever.

At Wigan many of the streets were unpaved, and almost covered with stagnant water, into which the inhabitants threw all kinds of rejected animal and vegetable matters, which then underwent decay, and emitted most poisonous exhalations. In many streets there were no privies, or, if there were, they were in such a filthy condition as to be absolutely useless. These filthy conditions were the most prominent source of the fevers which extensively prevailed.

At Leeds many of the courts were one mass of filth. During the preceding cholera epidemic seventy-five cartloads of manure were removed from one court of thirty-four houses. This manure had been accumulating for years.

At Hindley, where malignant fever was always more or less prevalent, in one street pools of stagnant water and heaps of manure extended from one end to the other.

In Inverness it was stated that very few houses could boast of either a water-closet or privy, and that only two or three public privies in the better parts of the town existed for the use of the great bulk of the inhabitants. There was not a street, lane, or place which was not disgustingly defiled at all times. When cholera prevailed in Inverness it was more fatal than in almost any other town of its population in Britain.

In London matters were as bad as in the provincial towns. Such sewers as existed were not allowed to be used for fæcal matter, hence thousands of cesspools were dug in the cellars, and probably many unsuspected ones still exist. One inspector stated that he had recently examined two houses and found the whole area of the cellars full of night-soil to a depth of three feet, which had been permitted for years to accumulate from the overflow of the cesspools. In another street he found the yards covered with night-soil and filth piled up against the walls. This accumulation was caused by the bad and inefficient drainage arrangements in the metropolis. In numberless houses in Westminster the cellars were constantly flooded, and having no drainage the occupiers were obliged to pump out the water, which, from being stagnant, was foul and offensive. If in the performance of this necessary duty the matter became known, the occupier was summoned and fined $25. No wonder, therefore, that in the great majority of cases the water remained in the cellars to the detriment of the health of the inhabitants of the houses above. The want of facilities for draining, the want of carriage and foot paving in the streets, the constant damp and unwholesome smells occasioned by the absence of all means to carry off the impurities caused both health and life to be sacrificed.

One more example must suffice. "In Edinburgh it was stated that until recently the Cowgate, a long street running along the lowest level of a narrow valley, had only surface drains. The various alleys from the High street and other elevated ground open into the street. In rainy weather they carried with them each its respective stream of filth, and thus the Cowgate bore the aspect of a gigantic sewer receiving its tributary drains. A committee of private gentlemen laid a sewer in this street, and met with such opposition and so many claims for damages that it was said not to be likely that the example would be followed. The practice of introducing water-closets was then becoming general in certain parts of the town, but in others nothing of the kind could be accomplished on account of the want of drains. Water was very sparingly used, because its supply was a monopoly in the hands of a joint stock company, and there were only two or three public wells."

In the report referred to you can find such instances multiplied *ad nauseam*. The investigation proved beyond all doubt that immense accumulations of filth existed in every town and village, that the sewerage systems and water supplies were most inadequate. "Towns," said the commissioners, "never change their encampments, and while the houses and streets, courts, lanes and streams are polluted and rendered pestilential, the civic officers have generally contented themselves with the most barbarous expedients or sit still amidst the pollution, with the resignation of Turkish fatalists, under the supposed destiny of the prevalent ignorance, sloth and filth. Such neglects are visited by the scourge of a regularly recurring pestilence and ravages of death more severe than a war."

It is this latter fact that gives to this report its great importance. It proved conclusively that the filthiest towns were the most unhealthy, and that the most unhealthy parts of towns, those notorious for the presence of malignant fevers, were the dirtiest and most uncleanly. It also brought out the fact that apart from disease, which appeared to be engendered by the filth, all other diseases were rendered more malignant in character by the gross pollutions of air, water and soil.

I think enough has been said to give you a fairly clear idea of the sanitary condition and the character of the sanitary administration in this country half a century ago. It is probably difficult for you to realize the conditions under which our parents lived, the improvements effected since then having been so great. Steam and electricity have revolutionized industries, the study of hygiene has revolutionized the conditions under which we live, and the general administration of the country, and it is probable that the

country owes more to the introduction of sanitary reforms effected by the sanitary engineer than to either steam or electricity.

We have practically stamped out malignant fever (typhus), and cholera we no longer dread, simply because we have now got rid of most of the filthy accumulations which at one time polluted the air, water and soil of towns and country alike, and have shaken off the fatal apathy of the Turkish pasha. For these we have substituted the alertness of the well-advised administrator who realizes the value of health, and knows that disease is in a great measure preventable.

The year 1842 may be said to have seen the close of the pre-sanitary and the dawn of the sanitary era. In 1844 the Health of Towns Commission presented their report, and in 1848, when another invasion of cholera threatened, the first public health act was passed.

The town councils of boroughs were constituted sanitary authorities, and local Boards of Health were formed. These authorities were given power to borrow money for works of sewerage and water supply, and also the powers necessary for carrying out such works. The act was, as might be expected, very inadequate and defective, but it had a marvelous effect, and continued in force until the great consolidating and more complete act of 1875 was passed.

A Trade Term Illustrated. This clever sketch shows how one of the boys in the office of Crane Co., Chicago, illustrates a much used trade term.

There is one effect produced by the 1848 act, which, however, must be referred to. Sanitary improvements were urgently needed, and Parliament had given all the powers necessary for raising money, etc., to carry out such improvements; but Parliament could not create sanitary engineers. But the sanitary engineer came into existence. Hitherto there had been no demand for men with such qualifications, and there were few who had had any practical experience in designing or carrying out works of a thoroughly sanitary character. No wonder, therefore, that during the process of evolution many mistakes were made, that much of the work then carried out has since been found to be very defective, and that in many instances one source of danger has been removed by means which introduced another. Sewers are badly constructed and ill-ventilated, drains were improperly laid, inefficiently trapped, the plumbing work was especially bad, and water supplies were not adequately protected.

In 1875 the public health act was passed, and the Local Government Board placed in control of sanitary affairs. Improvements have since been effected in nearly every town. Hundreds of systems of sewerage and works of public water supply have been carried out. The grossly insanitary conditions which existed in nearly all houses have been generally removed. Medical officers of health and sanitary inspectors were appointed to discover defects and suggest remedies, and there is now no lack of sanitary engineers ready to plan and superintend anything, from the drainage and water supply of a cottage to the sewerage of the largest city, or to the bringing of water from the mountains of Wales to the City of London.

Let us stay for one minute to estimate the saving of life effected so largely by the works of the sanitary engineer. The data we require can be obtained from the annual returns of the registrar-general, and are as follows: Death rate per 1,000 population, 1841-1850, 22.4; 1891-1900, 18.2; decrease, 4.2. Estimating the present population of England and Wales at 33,000,000, this decrease represents the saving of 138,600 lives annually, effected almost entirely by the works of sanitary improvement carried out by the sanitary engineers of the past and of the present generation.

In face of this enormous saving of life there are still so-called statesmen who deplore the indebtedness of our sanitary authorities, and call the expenditure of money on sanitary improvements "unremunerative investments." Why, gentlemen, no investment is so remunerative. Every right thinking person now accepts the dictum of the late crown prince of Austria, "that man is the most precious capital of the state and of society in general. Every individual represents a certain value, and to preserve this as intact as possible, and to its utmost limit, is not only a command of humanity, but also the duty of every community in its own interest." This aspect of the subject is one which has a great fascination for me, but time will not permit me to dwell further upon it.

Much has been done to improve the sanitary condition of the country; but much more remains to be done. There is still ample work for the sanitary engineer. The gross pollution of air, water and soil, which was so common half a century ago, is now rarely found; but such pollution is still going on throughout the length and breadth of the land. We no longer find our towns intersected by open sewers, and fouled by countless heaps of reeking filth, but we have defective sewers polluting the soil, defective drains and sanitary fittings, permitting of the pollution of the air, defective methods of excrement and refuse disposal. The danger is not less real because it is concealed. The exigencies of our civilization, and the consequent growth of towns, the connection of nearly all houses with sewers and water mains, have introduced fresh elements of danger, and additional problems now await solution. These are so numerous and so important that it is generally admitted our sanitary enactments require revision and codification, and that the whole sanitary administration, to be efficient, should be placed under the control of a special minister of state.

Of these problems I will only refer to one—the housing of the working classes. The aggregation of the laboring classes in towns is depopulating our rural areas and overcrowding our urban districts, both conditions which are to be deplored, and which sooner or later must be combated, if we wish to retain our pre-eminence as a nation.

In the endeavor to improve the housing of the rural laborer many rural sanitary authorities have adopted building by-laws which they find themselves powerless to enforce without preventing the erection of cottages altogether, and thus, by driving the laborers to the towns, making matters worse than before. The so-called model by-laws of the Local Government Board are, generally speaking, excellent when applied to towns, but in many respects they are not adapted to meet the requirements of rural districts. In the former, stability and freedom from risk from fire are of much greater importance than in the latter, and this stability, etc., can only be obtained at a cost which almost prohibits cottage building in the country. Quite recently the Local Government Board has issued a suggested code of building by-laws which are excellent so far as they go, but they do not go nearly far enough, inasmuch as the authori-

ties adopting them have no control whatever over the nature of the material of which the buildings are to be constructed, their proximity to other buildings, etc. A builder might put up a whole row of wooden or lath and plaster cottages, and in such a manner that if one caught fire the whole lot would inevitably be consumed, and of such a flimsy character that all of them in a few years would become unfit for human habitation.

I mention these by-laws because I wish to suggest that this Institute should consider the subject, with the object of improving those devised by the Local Government Board. If a suitable series could be devised they would be largely adopted, and the country generally be benefited thereby. I should also suggest, as many other associations are greatly interested in this matter, that they should, at a later stage, be invited to co-operate with our Institute.

Work of this character would not only benefit the public, but also indirectly the Institute, and there is no dearth of such subjects which you might with advantage consider. If the Institute is to flourish it must make its existence known outside its own circle of members, and endeavor to obtain a reputation for doing good work. Among its fellows there are many who have acquired special knowledge—knowledge not only of value to their fellow members, but interesting to the community at large. An organization such as this, especially if working in accord with kindred associations, should exercise a great influence in any future legislation of a sanitary character. I should like to see such influence secured, so that the opinions of the Institute should be desired, and be always treated with respect.

Progress must be our watchword. The sanitary millennium is not yet. From time to time some definite object should be selected for consideration, and the whole interest of the Institute be centered upon it, so that no session shall pass over without some good work being accomplished. Do not be too ambitious, but be ambitious enough. Enthusiasm in the council and officers will beget enthusiasm in the fellows and members, and each step forward will render further progress less arduous. Above all things, we must remember that we are not working for ourselves alone. Selfishness never leads to ultimate success. Our success will be proportionate to our forgetfulness of our individual interests, and to our acknowledgment of the paramount claims of sanitary progress, a progress which benefits the whole human race.

How You Should Talk to the Householder.

AT a recent meeting of the East Boston Citizens' Trade Association Dr. Frank C. Richards gave an address on the importance of household sanitation which might well serve as a model for the plumber who is trying to impress on the householder the importance of securing the best sanitary surroundings obtainable. Dr. Richards said, in part:

Some one has said that sentiment is one of the noblest attributes of mankind, and it might be added that the noblest sentiment is that which entwines its roots about the home and family circle. For the protection and preservation of these interests there is in the heart of every good citizen an innate sentiment which dominates his daily life. It is his constant aim and pleasure to supply his family with a comfortable habitation, proper food and clothing, and as many of the luxuries as his means will allow. If, unfortunately, sickness should enter the home, he secures what he believes to be the best of medical attendance and spares no pains or expense to restore the sick one to health. Absorbed in this praiseworthy effort to promote the welfare of his family, the average citizen, strange as it may seem, pays little or no attention to that fundamental prerequisite for all health and happiness, sanitation. Proud of his well furnished house, he seldom troubles himself as to whether it is properly drained, well ventilated, or kept at a proper temperature. A so-called "good provider" of an abundance of food, he gives little thought as to whether it is of suitable kind, properly cooked, or decently eaten.

As long as the surrounding temperature is conducive to his comfort he never worries about the quality of the air he breathes. Eagerly anxious to remedy the evil results of wrong living, he seldom connects effects with cause, or attempts to correct the influences which have led to his undoing. In short, it is undoubtedly true that people in general, either through ignorance or carelessness, pay little heed to the prevention of those physical ills which they so deeply deplore, and it is equally true that if half the anxious effort were expended for the promotion of health that is now put forth in combating disease, doctors would have less to do and the community would be better off. Evidence that sickness and deaths can be prevented is abundant and entirely conclusive. It would be inconsistent with the limits of this paper to present much of such evidence, but a few illustrative facts may be of interest. (1) It is well known that coincident with the generally improving sanitary conditions there has been a gradual increase in the average duration of human life throughout the past history of civilized man. (2) A few hundred years ago leprosy was a common disease in Great Britain; the map of England was dotted over with leper hospitals. Apparently through even such imperfect isolation as was practiced leprosy decreased until now it is a very rare disease in that country. (3) Not many years ago scurvy was a very common disease. Its causes became known, preventive methods were adopted, and now it is a rare disease. (4) In many countries through drainage of the soil, clearing of forests, and other measures tending to reduce the difference between the day and the night atmospheric temperature, there has been a very great reduction of the sickness from intermittent fevers. (5) The wonderful reduction of the mortality from smallpox which has followed the general practice of vaccination is well known. (6) The comparative recent immunity from cholera in this country is entirely due to preventive measures. (7) The same may be said of typhoid fever, diphtheria and even consumption. Indeed, a long list can now be made of diseases which in times past swept people off the earth, but which are no longer to be feared, because science has demonstrated them to be preventable diseases. Eminent men in the medical profession have prophesied that in the future the duties and labors of physicians generally will become more largely preventive than curative of disease, and I think no one will question that at the present day the doctor's usefulness in the community would be greatly enhanced if he would give more advice and less medicine.

While the creation of sanitary science and the promotion of general sanitation is necessarily a governmental function, each individual citizen has his part to play and should realize his personal responsibility in the prevention of unnecessary sickness. From a social science standpoint the prevention of disease is much more economical than its cure. Sooner or later the people generally will recognize this fact, and then there will be a general demand for knowledge of the principles of sanitation, and instead of employing the family physician solely to prescribe pills and powders he will occasionally be consulted as to the right methods of living. In the meantime it is the common belief that all measures of sanitation may be left confidently in the hands of the Board of Health. Now, although boards of health are

not elected at the polls, they are sometimes made in curious ways, and I fear not always for the benefit of the service, although I believe that the various boards of health of the state are, as a rule, composed of competent and thoroughly conscientious men. But like all government departments, their work becomes a matter of routine, and their duties are so numerous that they are obliged, in the large cities at least, to depend largely for their reports and detail work upon unskilled employes, who, too frequently, through ignorance, lack of interest, love of ease or other motive, slight or utterly neglect the duties they are expected to perform. Many instances of such neglect might be quoted, but it is not my purpose to attack our public servants. My wish is rather to impress upon you individually the fallacy of depending absolutely upon the inspections and corrective smokeless fuel combustion are: High temperature in the furnace (not less than 800 degrees F.); proper admixture of highly heated air with the gases thrown off by the coal, and time to produce complete combustion of the gases. Many small details are required to combine these conditions, especially in a boiler furnace of the ordinary type, which is simply a box surrounding a support for the fuel, the support being sufficiently open to admit a suitable supply of air.

High furnace temperature is necessary to insure complete combustion; the higher the temperature the easier it becomes to secure good combustion, and at the same time the conditions are favorable for securing very nearly perfect combustion. The higher the average furnace temperature the less air required per pound of coal. Where there are leaks of air in the furnace and the entering air does not properly mix with the fuel gases, that excess of air is a detriment, because of the low average temperature produced. A certain amount of time is necessary, after the air is mixed with the gases of combustion, to enable them to properly combine; the lower the average furnace temperature, the greater is the amount of time necessary for the combustion to become complete before the gases strike a surface that will cool them down and prevent their further combustion.

In nine-tenths of the boiler rooms the engineers or firemen are working in darkness regarding the efficiency of their boilers and furnaces, no provision being made to measure the temperature and quantities of fuel and water, but everything is done by guesswork. Every boiler room should have a draft gauge, a few thermometers to measure feedwater and flue gases, a pair of testing tanks and a reliable scale to enable the engineers to find out what is being done. They would very soon stop up all the cracks in the brickwork of their boilers to prevent the cold air from rushing in, which is so frequently the case. With such means provided an engineer would soon discover whether he had too much or not enough grate surface, for his flue temperature would tell him the story very plainly. Fine art in fuel combustion in boiler furnaces, and smoke prevention, can sooner be reached by the use of sensitive indicating instruments that will show what is taking place inside the furnace than by the means now employed.

Management of the Septic Tank.

THE use of the septic tank and bacterial contact beds as a means of sewage purification has within the past few years become quite common in England, where investigation and experiment have brought the process to a high degree of perfection. A paper read by the superintendent and chemist of the Manchester sewage works before the Royal Institute of Public Health at a recent meeting is full of interest to those who would know more about the workings of this modern method of sewage disposal. There is a growing feeling among sanitarians that the present method of pouring the sewage of cities into the nearest water course is a menace to the public health and that sooner or later all sewage will of necessity first be purified before being turned into streams which serve as sources of water supply. England is undesirably far ahead of us in this particular and it behooves us to familiarize ourselves with the progress made and to profit accordingly. Speaking of the purpose of the system tank and the proper management required to attain the best result, the superintendent says:

The objects of careful management of septic tanks will be: (1) To dissolve or gasify as much sludge as possible; (2) to obtain a tank effluent in which the matters in solution are easily nitrified; (3) to produce a tank of effluent with little suspended matter; (4) to avoid creating a nuisance. Taking these points in order:

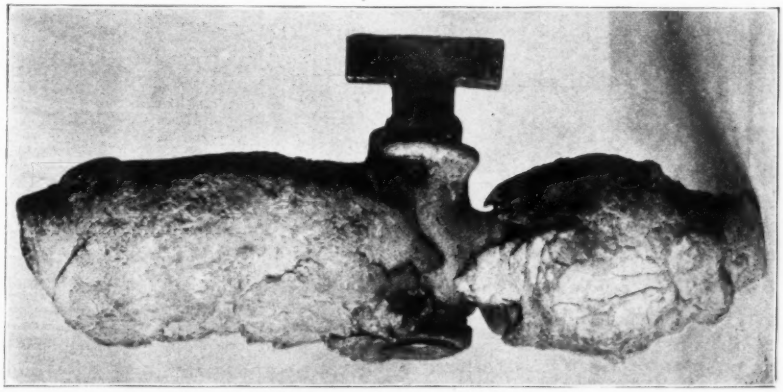
1. Destruction of Sludge in Septic Tank—It must always be remembered that no bacteria have yet been discovered which will consume mineral matter. In all cases, therefore, where road detritus is mixed with the sewage, ample catchpit accommodation should be provided. I have heard of a sewage committee who were so enthusiastic for the septic system, that in spite of the protests of their manager they abolished all catchpits before their septic tanks, saying that if they were to have septic treatment it should be "gradely." Unfortunately their manager's fears were realized, and their tanks rapidly silted up and their enthusiasm for septic treatment is probably on the wane.

Having provided grit chambers, it is necessary that they should be cleared out at frequent intervals, or they cease to be catchpits. The size of catchpit will depend on local conditions, the frequency of cleansing on the weather, most of the grit coming down in storms. If the catchpits are too small all the grit will not be arrested; if too large, sludge, which might otherwise have been bacterialized, will be taken away with the grit. Besides grit it is, in my view, well to screen out bits of wood, rags, etc. as such cellulose material is only very slowly attacked in the septic tank. All such matters, together with the grit, cinders, unburnt coal, etc., which is often present from boiler house drains, should, if possible, be burnt. Wherever it can be done, it will be advantageous to have the town's refuse destructor set up at the sewage works; all catchpit and screen refuse can then be burnt with the town's refuse, and a supply of clinker obtained for bacteria beds. Having removed insoluble substances from the sewage, it will be possible to obtain a higher percentage of destruction in the septic tank.

It will be found that on starting a new septic tank (as in the case of a bacteria bed) that the action begins slowly and gradually arrives at a maximum. It is important,

therefore, that the ultimate flow should not be passed through the tank at first, lest sludge should rapidly accumulate before septic action is established. When one septic tank is fully at work, another may easily be started by pumping into it enough sludge from the first to just cover the bottom. I fear it will not be possible for one authority to supply another with septic sludge to inoculate their tanks, as the amount which can conveniently be carried by rail is not enough for the purpose. I once by request sent a barrel of septic sludge to another town, and heard that it had exploded en route.

2. Production of Easily Nitrified Effluent From Septic Tanks.—It must be emphasized in dealing with this point that by no means the least important function of the septic tank is to so change and break down the soluble constituents of the sewage that these are readily nitrified when



A FINE SPECIMEN OF JOINT WIPING.
One of the inspectors of the Chicago Health Department recently discovered this joint in a Chicago residence and insisted on cutting it out as a specimen of the beautiful work done by some of Chicago's tinsmith plumbers.

put upon bacteria beds. Even if but little reduction in sludge took place this action alone would justify the use of septic tanks. If the flow through the septic tank is at full strength, fresh sewage may find its way on to the beds, and will fail to be purified, for it has been definitely established that beds which have become accustomed to septic sewage will not at once purify fresh sewage, and vice versa. Apparently unaccountable changes in the efficiency of bacteria beds may sometimes be traced to this cause. An increased flow of sewage diluted by rain may be safely put through, as in this case the proportion of organic matter per gallon will be less. It is also quite possible, I believe, to work a septic tank too slowly, and produce a putrid effluent which is actually poisonous to the nitrifying organisms. Possibly some complaints of the nuisance arising from septic tanks may be due to this cause. The exact rate of flow to be adopted will depend on local conditions.

3. Reduction of Suspended Matter in Septic Tank Effluent—The ultimate product of septic action upon sludge, besides the soluble substances above mentioned and the gases methane, carbonic acid, hydrogen and nitrogen, is a very finely divided suspended matter, partly of the nature of humus, partly mineral—e. g., finely divided clay, or sulphide of iron (if iron salts are present in the sewage.) This tends to pass away with the effluent, and on to the bacteria beds.

To avoid this result, an attempt has been made in Manchester to remove the fine suspended matter by a special pipe communicating with the grit chamber. By such a device it is hoped that the two insoluble products, the grit on the one hand and the humus on the other, may be taken away from time to time without disturbing the action of the tank. The experiment has not been tried long enough to definitely decide as to its success, but so far there seems no reason why this arrangement should not effect the object in view.

4. Avoidance of Nuisance—A good deal of apprehension has been expressed as to the possibility of nuisance arising from septic tanks, and it is certainly a matter for serious consideration. The residual sludge and grit, if removed as suggested, can be pressed and used for manure or burnt. The silt alone is quite innocuous, and if tipped is rapidly converted into a dry sandy heap. Covering the tank is not a real prevention of the nuisance, unless the gas evolved is collected and burnt. The heat from it may find useful application in drying the garbage, etc., before it is sent to the destructor above mentioned. The value of the gas for this or other purposes will go a long way toward defraying the cost of covering the tanks. In Manchester, Leeds, Accrington and other places, however, there is, singularly, little smell either from the open tank or from the sludge.

With reference to the management of contact beds he says:

The management of contact beds should be directed toward (1) the production of a pure effluent; (2) the maintenance of capacity; (3) minimum expenditure of labor.

1. Production of a Pure Effluent—(a) Equable Composition of Septic Tank Effluent—One of the chief factors in producing a good contact bed effluent or filtrate is the absence of great variation in the composition of the septic tank effluent. The importance of this has already been indicated when speaking of the management of the septic tank, and will be more easily achieved if manufacturers can be induced to send down their refuse in a steady stream, and not in intermittent flushes. In most cases there is little difficulty in obtaining their co-operation to this end. Successful bacterial treatment of sewage will need certain restrictions to be enforced as to what may or may not enter the sewers, but for the most part these restrictions are already embodied in the Public

Health Act Amendement Act, and are not such as to press unduly upon manufacturers. It is often to their advantage that their trade refuse should be under careful supervision, as unsuspected sources of waste are often discovered by this means.

1. (b) Thorough Drainage of Bed—The thorough drainage of a bacteria bed is of the first importance in securing a good effluent. If the water cannot get out the air cannot get in, and the lower parts of the bed rapidly become putrid and the nitrates decrease, perhaps are quite absent. Further reference will be made to drainage when considering the question of capacity. Here it must be emphasized that when the nitrates decrease (and simultaneously there will always as a rule be an increase of nitrates), the beds must be rested. With experience, a modification of the three minutes' oxygen absorption test may be adopted as an index to the efficiency of the bed, which may be put into the hands of a workman to carry out. For a given sewage there is generally a pretty constant relation between the three minutes' oxygen absorption test and the other determinations—ammonia, nitrate, etc. If an acid solution of permanganate of known strength is made up in the laboratory and given to the filter foreman, with a measuring glass, by mixing known quantities of the contact bed effluent and the permanganate solution, he can readily ascertain the character of the effluent by the rapidity with which the permanganate is decolorized.

2. Maintenance of Capacity—It is quite possible for the effluent from the bed to continue excellent in composition, although the bed may be falling off very much in capacity. Careful note must therefore always be made of the time of filling under identical conditions if more accurate methods of measurement are not available, and if it begins to rapidly decrease the bed must be rested. The chief cause of less capacity are as follows: (a) settling together of the material; (b) growth of organisms; (c) impaired drainage; (d) solid matter entering the bed; (e) breaking down of material.

2. (a) Settling Together of Material—This must always occur, and largely accounts for the initial rapid decrease in capacity after the bed had been at work for a short time. It may, indeed, often be necessary to put an additional quantity of material upon the bed to maintain the surface at its original level.

2. (b) Growth of Organisms—This is at once the cause of increased efficiency in the bed and of loss of capacity. On examining the material of a contact bed in active condition every piece of it—clinker, coke, whatever it may be—will be found coated over with a slimy growth. If this is removed it is found to be a stiff jelly, which, after a little drying, can be cut with a knife. Before examining under the microscope it should be treated with dilute acid to remove as much as possible of any hydrated oxide of iron present. It will then be found to consist of masses of bacteria and zoogloea. If placed in a tube connected with a manometer the jelly will rapidly absorb all the oxygen with production of carbon dioxide. This action will sometimes produce a vacuum equal to 6 inches of mercury. This experiment shows that there is little need to force air into a bed. As a matter of fact there is always a large amount of oxygen to be found in the bottom of a bed in good condition, owing to the interchange of gases which naturally takes place.

The behavior of the bacterial jelly appears to afford a clew to the successful working of bacteria beds. By working them at high speed; i. e., filling them frequently in the day without long periods of rest, the effluent may remain good, but the bacterial growth so rapidly increases that the bed becomes too spongy, and will not allow the water to drain away. Here, too, is the explanation of the fact that, within limits, decrease of capacity is accompained by increase of efficiency. This decrease of capacity may, however, become so great as to more than outweigh the advantage of increased efficiency. A long period of rest, say one or two weeks, must then be given to the bed. The superfluous bacterial growths will during this time be rapidly consumed, and the capacity of the bed will greatly increase.

Increase of capacity due to this cause is not a merely temporary phenomenon, produced by the drying of the bed. One of the Manchester experimental beds, for instance, sank in capacity during the winter of 1899-1900 to such a low point as 1,480 gallons (the capacity at the beginning of the experiment being 4,200 gallons). At the present time, after fifteen months have elapsed, during which the bed has been in regular use, its capacity under similar conditions of measurement is 2,000 gallons, and it has not reached its full summer capacity. This result has been brought about simply by judicious periods of rest. It has been found in the course of experiment that these should not exceed a fortnight at most, as the bed then tends to dry up and the activity of that organism ceases.

These results cause me to think that the policy of pushing the working of the bed to its utmost extent and frequently washing the material, as recommended by Dr. Dunbar of Hamburg, is not really satisfactory. By washing the material the bacterial jelly is removed, and will have to be re-formed before the bed is completely efficient. The time spent in washing, if given to rest, the bed would probably produce an almost equal rise in capacity, when the initial period of slow working required for regaining the efficiency of the washed bed is taken into account.

2. (c) Impaired Drainage—This matter has already been dealt with in speaking of the causes which tend to deteriorate the effluent. It cannot be too strongly emphasized that every care should be taken in designing the bed to make the drainage as efficient as possible. There should be no opportunity given for the finer particles of the material to work down and block the interstices of drain pipes, etc. The half-acre beds which are being constructed in the Manchester scheme are provided with radial channels all converging to the exit penstock. The channels will be covered with perforated tiles or cement blocks, and over these will be placed at least 1 ft. of large lumps of clinker.

2. (d) Solid Matter Entering Bed—The decrease of capacity owing to solid inorganic matter entering the bed is not necessarily great inasmuch as this material especially if of a sandy nature, has itself a water holding capacity. Its character will depend on the locality—i. e.,

whether the district is gravelly or clayey, etc. In any case the dry capacity of the bed will not be greatly affected. The danger is that the interstices of the bed may be filled up with clayey mud, which in the wet state will hold up the water and so decrease the wet or working capacity. The loss of capacity will not be affected by resting, and therefore all such solid matter should be retained as far as possible on the surface of the bed, and removed from time to time. It will be found to constitute excellent soil, as it will contain nitrates and phosphates from the sewage, and cabbages and other vegetables will readily grow upon it. A way is open here to allay the fears of agriculturists who view with alarm the improvement of the land following upon modern methods of water carriage of sewage.

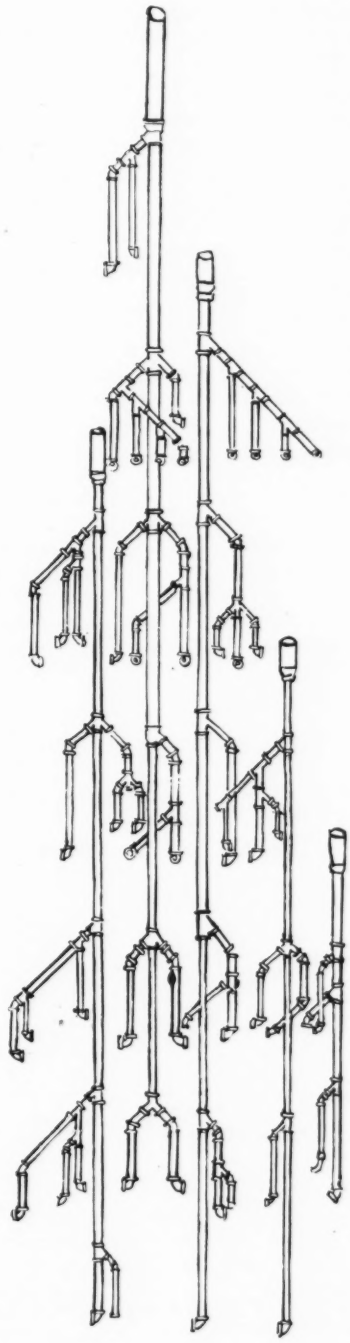
2. (e) Breaking Down of Material—A more serious cause of loss of capacity than any of the foregoing is the disintegration of the material of the bed. This should be avoided at all costs by using only hard refractory material. When clinkers are used, as will probably be most commonly the case, such only as are hard and well fused should be put into the bed. All shale and ashes must be rejected. As a matter of fact the ordinary weathering which an old cinder tip undergoes, will generally have resulted in the disintegration of all but the harder portions. On screening, therefore, the fines will retain most of the soft material.

To summarize the foregoing: For the successful working of bacteria beds the following method of procedure will be calculated to give the best results. The bed must be worked very slowly at first, in order to allow it to settle down and the bacterial growths to form. In this way there will be less danger of suspended matter finding its way into the body of the bed while the material is still loose and open. The burden should not be increased till analysis reveals the presence of surplus oxygen, either dissolved, or in the form of nitrates, in the effluent. Analysis of the air in the bed may usefully be made from time to time during resting periods.

Also the variations in the capacity should be carefully recorded. If the capacity is found to be rapidly decreasing a period of rest should be allowed. Long periods of rest should be avoided during the winter, as when deprived of the heat of the sewage the activity of the organisms decreases. If necessary the burden on the bed should then be decreased by reducing the number of fillings per day, rather than by giving a long rest at one time.

The suspended matter may be retained on the surface by covering the latter with a layer of finer material not more than three inches in depth. This should not be raked into the bed, but when the amount of suspended matter retained becomes excessive it should be scraped off. This suspended matter may be tipped and made use of for agricultural purposes. By placing the inlet and outlet penstocks as close together as possible the suspended matters will tend to concentrate at this point, and their removal will be facilitated.

After many years, it may, in spite of all precaution, be necessary to wash a portion at any rate, of the material. It should not be difficult to devise a machine by which this may be easily and cheaply done, purified effluent water from a neighboring bed being used for the purpose. This mud so washed out will readily dry, and may be also used for raising vegetables.



THE LUNGS OF ONE OF CHICAGO'S PUBLIC BUILDINGS.

This interesting sketch by one of the inspectors of plumbing in the office of the Health Department of Chicago shows how the sewer system in one of Chicago's public buildings breathes. It represents the system of back venting.

3. The Minimum Expenditure of Labor—Unfortunately, data for the actual cost of maintenance of bacteria beds are still limited. Experience with experimental beds,

at Manchester and at Oldham, where several acres of beds have been at work for upwards of three years, shows that it should be by no means excessive. Facilities should always be provided in designing beds for the economical removal of material from the surface.

The evidence all points to the conclusion that with careful management, founded on chemical and bacteriogical knowledge, the sewage even of large manufacturing towns may be efficiently and economically purified by bacterial methods. Thus we may look forward to a time when the unsightly cinder heaps of our manufacturing districts will be removed to find useful application in purifying the vast volume of their waste liquids. As a consequence large open spaces will once more be set free, which may be utilized for the good of the community. Further, by careful removal of the surface of the beds from time to time, the nitrates and phosphates may be largely recovered from the sewage, and in a perfectly inoffensive form be returned for the service of agriculture. At the same time the standing reproach of our civilization which is presented by the abominable condition of the rivers and streams near our large towns would be removed, and science shows itself equal to the demands made by the ever-changing problems of social development.

A Century of Progress.

Marvelous Progress of Engineering Skill in the Century just closed.

By J. James R. Croes.

IN a paper read by Mr. Croes before a recent meeting of the American Society of Civil Engineers the author dwelt at some length upon the progress made in all lines of engineering, and laid emphasis on the conditions of affairs nowadays as compared with those of a hundred years ago. The modern office building he considered as most typical of the progress made, and inasmuch as the modern office building is so largely the result of modern methods of plumbing, heating, lighting and ventilating, we are sure our readers will read with lively interest the following extract from Mr. Croes' paper:

One hundred years ago, the man of enterprise who resided fifty miles from a large city and wished to consult an engineer regarding a project for a new canal, arose before daylight, struck a spark from his flint and steel, which, falling on a scrap of tinder, was blown by him into flame and from that a tallow dip was lighted. In the same primitive manner the wood fire was kindled on the kitchen hearth and his breakfast was cooked in a pot and kettle suspended from the iron crane in the fireplace. Entering the cumbrous stage coach, hung on leather springs, which passed his door, he was driven over muddy roads, crossing the narrow streams on wooden trestle bridges and the navigable rivers on a ferry-boat, the paddle wheels of which were turned by a mule on a treadmill. At last he was landed in the city, where he walked through dirty streets paved with cobblestones until he reached his destination, a plain three-story brick building founded on sand, with a damp cellar and a cesspool in the back yard. Entering a dark hall he climbed a wooden staircase and was ushered into a neat room, rag-carpeted, warmed by a wood fire on the open hearth and lighted by a sperm oil lamp with one wick, for it was dark by this time. No wonder that before proceeding to business he was glad to take a good stiff noggin of New England rum.

To-day, his grandson, living at the old homestead, while comfortably eating his breakfast, which has been cooked over a gas range, reads in his morning paper that the high dam of the irrigation reservoir in Arizona, in which he is interested, sprang a leak the day before, and he telegraphs to his engineer in the city that he will meet him at his office at noon. Then, striking a match, he lights the lamp of his automobile, which is fed by petroleum brought 200 miles underground in pipes from the wells, rolls over macadamized roads to the railroad station, where he boards a luxuriously appointed train, by which he is carried above all highways, through tunnels, under rivers, or across them on long-span steel bridges, and in an hour is deposited in the heart of the city, where he has his choice of proceeding to his destination through clean and asphalt-paved streets in electric surface cars at nine miles an hour, elevated steam cars at twelve miles an hour, or through well-lighted and ventilated tunnels at fifteen miles an hour. Reaching the spot his grandfather had visited, he finds there a huge and highly decorated building, twenty or more stories high. Founded on the primeval rock, far below the surface of the natural ground, the superjacent strata of compressible material having been penetrated by caissons of sheet metal sunk by the use of air, compressed by powerful pumps driven by steam or electricity generated at a power station half a mile or more away, and on these caissons filled with a manufactured rock such as the ordinary processes of nature would require millions of years to produce, there is erected a cage of steel, the composition of which has been specified, and the form and mode of construction of which have been so computed that the force of the elements cannot overthrow the structure or even cause it to sway perceptibly. Towering above the courts of law, the temples of religion and the palaces of the arts, the meshes of this mighty cage are filled with products of the earth, the mine and the forest, transformed so as to be strong and light and incombustible, and all interwoven with pipes and wires, each in its proper place and noted on the plans. In one set of these pipes there is pure water, which has been collected from a mountain area of igneous geological formation, depopulated and free from swamps, on which a record of the daily rainfall is kept, and in which impounding reservoirs have been constructed by masonry dams across its valleys. From these reservoirs the water, after filtration through clean sand, is conveyed thirty or forty miles through steel or masonry conduits to covered reservoirs, whence it is drawn as needed through cast-iron pipes to the building where it is to be used, and there distributed to all parts of it, chilled nearly to the freezing point through one system of pipes or heated nearly to the boiling point through another system. Another set of pipes carries steam which, passing through radiators, keeps the temperature of the air throughout the building at the proper standard for comfort. Sanitary conveniences are provided everywhere, and all wastes are consumed within the building by the surplus heat generated, leaving only ashes to be removed. Wires convey electric currents to all points, so that the occupant of a room, sitting at his desk, can by the touch of a button ventilate his apartment, illuminate it, call a messenger, be kept informed of every fluctuation in the markets, converse with anybody who is not "busy" within forty miles of where he sits, and if entirely "up to date" can require his autograph and portrait to be reproduced before his eyes for identification. He

dictates his correspondence and his memoranda, and "takes his pen in hand" only to sign his name. He need not leave his seat except to consult the photograph hanging on the wall, which shows to him the latest condition of the mine, the railroad, the arid lands irrigated, the swamps reclaimed, the bridge in progress, the steamship, the water-works, the tunnel or the railroad, the dam, the filter or the sewage works, the town, the machine, the power plant or the manufacturing establishment in which he is most interested.

Entering the brilliantly lighted hallway of this building, the air of which is kept in circulation by the plunging up and down of half a dozen elevators, the visitor is lifted at a speed of 500 feet a minute, past floor after floor, crowded with the offices of financiers, contractors, promoters of traffic and of trade, lawyers, chemists, manufacturers, to the headquarters of the controlling genius of the whole organism, the civil engineer. For he it is to whom all the members of this microcosm must apply for aid and advice in the successful operation of their respective occupations. It is not his to mechanically transform elements into matter, or matter into other forms, or to show how energy may be produced, but to direct the application of energy to the various forms of matter, original or produced, in such way as to bring about the most satisfactory results in the most speedy and economical manner.

Strict Plumbing Inspection.

TO-DAY the plumber is the most important person in town. Kansas City is getting an object lesson in the importance of good plumbing. This weather would cause frozen pipes in the most careful work, but the fact remains that care is worth while, and most of the accidents are owing to mistakes and carelessness. Plumbing—which is a term used by the public to include water piping, gas piping, sanitary drainage and steam fitting—is the dark and mysterious craft to most persons who are otherwise well informed, and they think plumbing is good if the pipes in sight look neat. Architects and builders have been caught in the most woful blankness of mind on the subject of piping buildings. Public ignorance and the ignorance of those who should know put a premium upon bad work, and hence there is more botching in the craft of pipe fitting than any trade on the tip of the tongue.

Good plumbing begins and ends with the observance of rules. Pipes should be of such size, according to length and openings, and they should be protected from freezing by being laid in certain ways or not at all. The rules consist of the best known experience, and good work means compliance with the rules direct. To enforce "iron-clad" rules requires a mean man who will not deviate from them for any man or any occasion. Whenever the water department, the gas company and the plumbing inspector become lenient and set aside the regulations, the bad work rushes through the breach in a flood. The interest of every master plumber and every conscientious workman lies in a rigid enforcement of rules and regulations. They should insist upon sweeping and severe inspection by the water department, which fixes the rules of piping for water; the gas company, which inspects gas fitting, and the plumbing inspector, who looks after sanitary work. Water and gas should not be turned on or permission given to connect with the sewers until the work has been seen and accepted.—*Kansas City (Mo.) Star.*

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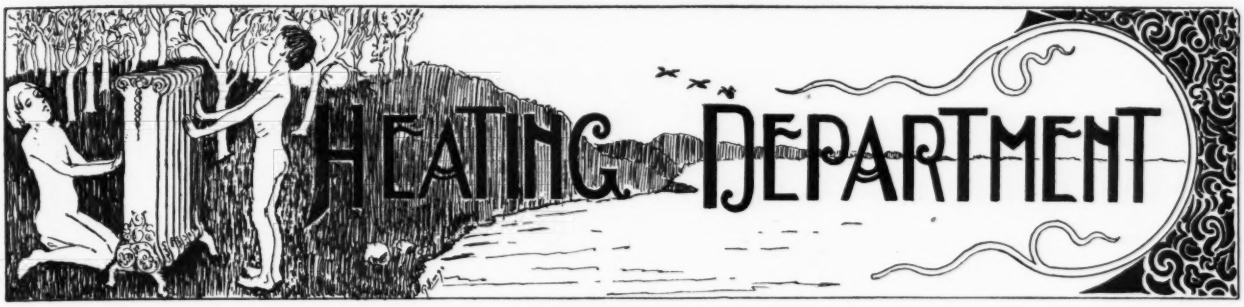

Heating and Ventilation—XII.

A Course of Lectures which, when completed, will cover the theory and practice of those arts.

By Chas. L. Hubbard, of Boston, Mass.

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Copies of issues of Domestic Engineering containing the eleven previous installments may be had at 20 cents each.

Pipe Connections.

There are various methods of connecting the radiators with the mains and risers. Fig. 36 shows a radiator connected with the horizontal flow and return mains which are located below the floor. The manner of connecting with a vertical riser and return drop is shown in Fig. 37. As the water tends to flow to the highest point, the radiators on the lower floors should be favored by making the connection at the top of the riser and taking the pipe for the upper floors from the side as shown. Fig. 38 illustrates the manner of connecting with a radiator on an upper floor where the supply is connected at the top of the radiator.

The connections shown in Figs. 39 and 40 are used with the overhead system shown in Fig. 35.

Where the connection is of the form shown at the left in Fig. 37, the cooler water from the radiators is discharged into the supply pipe again so that the water furnished to the radiators on the lower floors is at a lower temperature, and the amount of heating surface must be correspondingly increased to make up for this loss.

For example.—If in the case of Fig. 35 we assume the water to leave the heater at 180 degrees and return at 160 we shall have a drop in temperature of 10 degrees on each floor, that is, the water will enter the radiator on the second floor at 180 degrees and leave it at 170 and will enter the radiator on the first floor at 170 and leave it at 160. The average temperatures will be 175 and 165 respectively. The efficiency in the first case will be 175—70 equals 105, and 105 multiplied by 1.5 equals 157. In the second case

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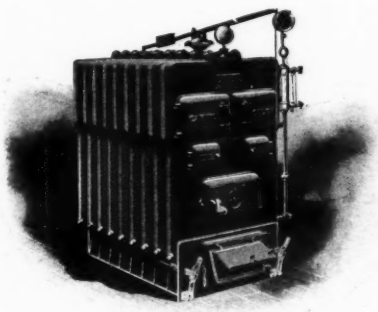

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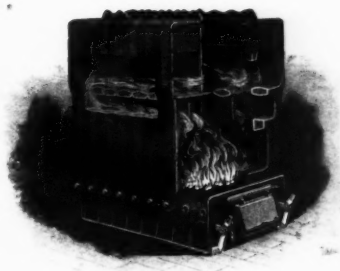

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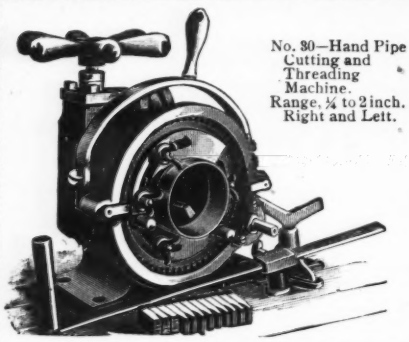

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165—70 equals 95, and 95 multiplied by 1.5 equals 140, so that the radiator on the first floor will have to be larger than that in the second floor in the ratio of 157 to 142, in order to do the same work.

Where the radiators discharge into a separate return as in the case of Fig. 32 or those at the right in Fig. 35, we may assume the temperature of the water to be the same on all floors and give the radiators an equal efficiency.

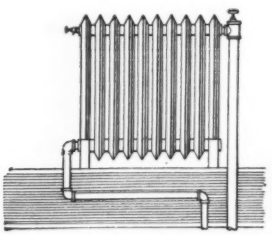


FIG. 36.

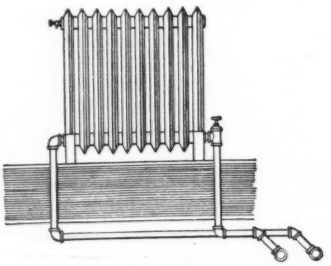


FIG. 37.

In a dwelling house of two stories no difference would be made in the sizes of radiators on the two floors, but in the case of a tall office building corrections would necessarily be made as described.

Where circulation coils are used they should be of a form which will tend to produce a flow of water through them. Figs. 41, 42 and 43 show different ways of making up and connecting these coils. In Figs. 41 and 43 the supply pipe may be either drops or risers, and in the latter case the return may be carried back if desired into the supply drop as shown by the dotted lines.

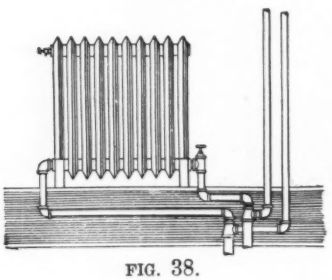


FIG. 38.

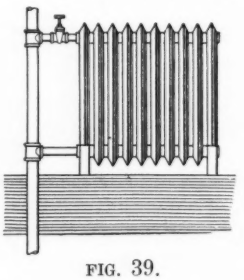


FIG. 39.

Combination Systems.

Sometimes the boiler and piping are arranged for either steam or hot water, since the demand for a higher or lower temperature of the radiators might change.

The object of this arrangement is to secure the advantages of a hot water system for moderate temperatures, and of steam heating for extremely cold weather.

As less radiating surface is required for steam heating, there is an advantage due to the reduction in first cost. This is of considerable importance as a heating system must be designed of such dimensions as to be capable of warming a building in the coldest weather, and this involves the expenditure of a considerable amount for radiating surfaces, which are needed only at rare intervals. A combination system of hot water and steam heating requires, first, a heater or boiler which will answer for either purpose; second, a system of piping which will permit the circulation of either steam or hot water; and, third, the use of radiators which are adapted to both kinds of heating. These requirements will be met by using a steam boiler provided with all the fittings required for steam heating, but so arranged that the damper regulator may be closed by means of valves when the system is to be used for hot water heating. The addition of an expansion tank is required, which must be so arranged that is can be shut off when the system is used for steam heating. The system of piping shown in Fig. 32 is best adapted for a combination system, although an overhead distribution as shown in Fig. 35 may be used, by shutting off the vent and overflow pipes, and placing air valves on the radiators.

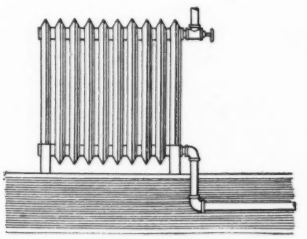


FIG. 40.

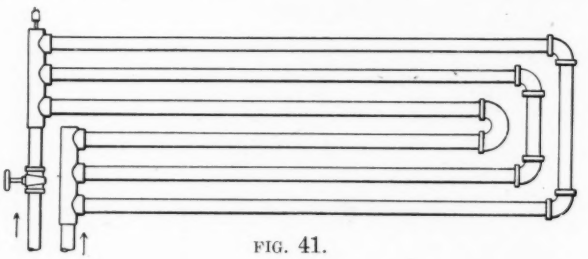


FIG. 41.

While this system has many advantages in the way of cost over the complete hot water system, yet the labor of changing from steam to hot water will in some cases be troublesome, and should the connections to the expansion tank not be opened, serious results would follow.

Valves and Fittigs.

Gate valves should always be used in connection with hot water piping, although angle valves may be used at the radiators. There are several patterns of radiator valves made especially for hot water work; their chief advantage lies in a device for quick closing, usually a quarter or half turn being sufficient to open or close the valve. Two different designs are shown in Figs. 44 and 45.

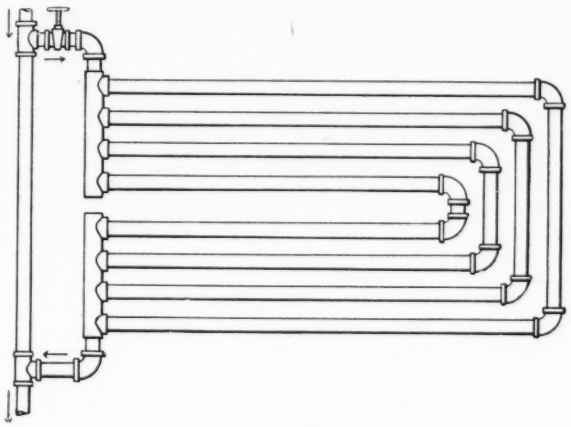


FIG. 42.

It is customary to place a valve in only one connection as that is sufficient to stop the flow of water through the radiator; a fitting known as a "union elbow" is often employed in place of the second valve. (See Fig. 46.)

Air Valves.

The ordinary pet-cock air valve is the most reliable for hot-water radiators, although there are several forms of automatic valves which are claimed to give satisfaction. One of these is shown in Fig. 47. This is similar in construction to a steam trap. As air collects in the chamber, and the water line is lowered, the float drops, and in so doing opens a small valve at the top of the chamber which allows the air to escape. As the water flows in to take its place the float is forced upward and the valve is closed.

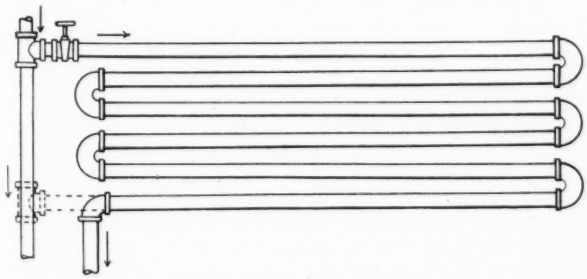


FIG. 43.

All radiators which are supplied by risers from below should be provided with air valves placed in the top of the last section at the return end. If they are supplied by drops from an overhead system the air will be discharged at the expansion tank and air valves will not be necessary at the radiators.

Fittings.

All fittings, such as elbows, tees, etc., should be of the "long turn" patterns. If the common form is used, they should be a size larger than the pipe, bushed down to the proper size. The long turn fittings, however, are preferable.

Pipe Sizes.

The size of pipe required to supply any given radiator depends upon four conditions; *first*, the size of the radiator; *second*, its elevation above the boiler; *third*, the length of pipe required to connect it with the boiler, and *fourth*, the difference in temperature between the supply and return. The following illustration will serve to make these points clear:

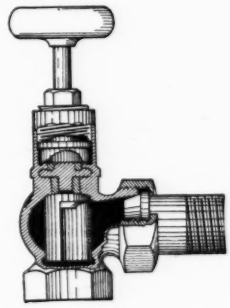


FIG. 44.

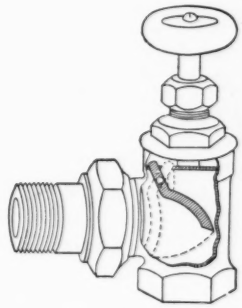


FIG. 45.

If we should take a glass tube of the form shown in Fig. 48, fill it with water and hold it in a vertical position, we would notice that the water remained perfectly quiet; now if the flame of a lamp be held near the tube A and a few drops of coloring matter be poured into the tube, we would find that the water was in motion, and the current would be in the direction shown by the arrows. When the water in both tubes was at the same temperature the two columns

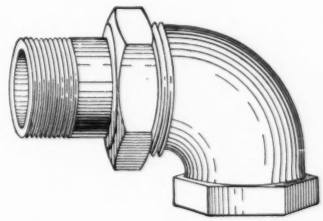


FIG. 46.

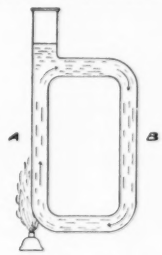


FIG. 48.

are of the same weight and remain in equilibrium. If, however, we heat the water in column A, it expands and becomes lighter than column B, and is forced upward by the heavier water falling toward the bottom of the tube.

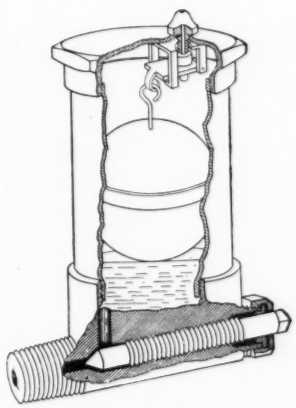


FIG. 47.

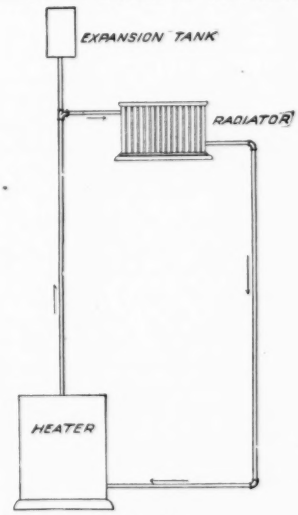


FIG. 49.

The heated water flows across the top and into B, where it takes the place of the cooler water which is settling to the bottom. As long as there is a difference in the temperature of the two columns this action will continue. If now we replace the lamp by a furnace, and connect the two columns

A and B at the top by inserting a radiator, we shall have the same illustration in practical form as utilized in hot water heating. (See Fig. 49).

The heat given off by the radiator always insures a difference in temperature between the columns of water in the supply and return pipes, so that as long as heat is supplied by the furnace the flow of water will continue.

TABLE III.

Size of Riser.	Square Feet of Radiating Surface.					
	1st Story	2d Story	3d Story	4th Story	5th Story	6th Story
1	30	55	65	75	85	95
1¼	60	90	110	125	140	160
1½	100	140	165	185	210	240
2	200	275	375	425	500	
2¼	350	475				
3	550					
3½	850					

The greater the difference in temperature of water in the two pipes, the greater the difference in weight, and consequently the faster the flow. The greater the height of the radiator above the heater the more rapid the flow, for the difference in weight between two columns 1 foot high and two columns 10 feet high is ten times as great and if there were no friction in the pipes the flow would be directly

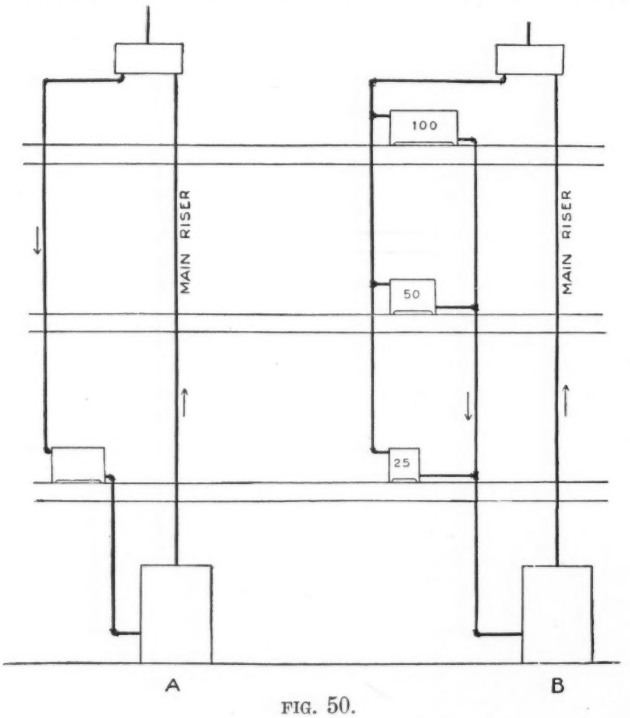


FIG. 50.

proportional to the elevation of the radiator above the heater. The quantity of water discharged by a given pipe under constant pressure varies inversely as the length of pipe; that is, if a pipe 100 feet long will discharge 10 gallons per minute under a given pressure, it will discharge only half as many gallons if the length is increased to 200 feet, the pressure remaining the same.

As it would be a long process to work out the required size of each pipe for a heating system, the following tables have been prepared, covering the usual conditions to be met with in practice.

Table III gives the number of square feet of direct radiation which different sizes of mains will supply for varying lengths of run.

These quantities have been calculated on a basis of 10 feet difference in elevation between the center of the heater and the radiators, and a difference in temperature of 17 degrees between the supply and return.

This table may be used for all horizontal mains. For the vertical risers or drops, table IV may be used. This has been computed for the same difference in temperature and gives the square feet of surface which different sizes of pipe will supply on the different floors of a building, assuming the height of the stories to be 10 feet. Where a single riser is carried to the top of a building to supply the radiators on the floors below, by drop pipes, we must first get what is called the "average elevation of the system" before taking its size from the table. This may be illustrated by the following diagram, (see Fig. 50).

In A we have a riser carried to the third story and there a drop brought down to supply a radiator on the first floor. The elevation available for producing the flow in the riser is only 10 feet, the same as though it extended only to the radiator. The water in the two pipes above the radiator is practically at the same temperature and therefore in equilibrium, and has no effect on the flow of the water in the riser. (Actually there would be some radiation from the pipes, and the return, above the radiator, would be slightly cooler, but for purposes of illustration this may be neglected). If the radiator was on the second floor the elevation of the system would be 20 feet (see B), and on the third floor 30 feet, and so on. The distance which the pipe is carried above the first radiator which it supplies has but little effect in producing a flow, especially if covered, as it should be in practice. Having seen that the flow in the main riser depends upon the elevation of the radiation, it is easy to see that the way in which it is distributed on the different floors must be considered. For

TABLE IV.

Size of Pipe.	Square Feet of Radiating Surface.								
	100 ft. Run.	200 ft. Run.	300 ft. Run.	400 ft. Run.	500 ft. Run.	600 ft. Run.	700 ft. Run.	800 ft. Run.	1000 ft. Run.
1	30								
1¼	60	50							
1½	100	75	50						
2	200	150	125	100	75				
2½	350	250	200	175	150	125			
3	550	400	300	275	250	225	200	175	150
3½	850	600	450	400	350	325	300	250	225
4	1200	850	700	600	525	475	450	400	350
5		1400	1150	1000	900	850	775	725	650
6				1600	1400	1300	1200	1150	1000
7							1706	1600	1500
8									

example, in B, Fig. 50, there will be a more rapid flow through the riser with the radiators as shown than there would be if they were reversed and the larger one were placed upon the first floor.

We get the average elevation of the system by multiplying the square feet of radiation on each floor by the elevation above the heater, then add these products together and divide the same by the total radiation in the whole system. In the case shown in B the average elevation of the system would be.

$$\frac{(100 \times 30) + (50 \times 20) + (10 \times 25)}{100 + 50 + 10} = 26 + \text{feet},$$

and we must proportion the main riser the same as though the whole radiation were on the second floor. Looking in table III we find for the second story that a 1½ inch pipe will supply 140 square feet and a 2 inch pipe 275. Probably a 1½ inch pipe would be sufficient.

Although the height of the stories varies in different buildings, 10 feet will be found sufficiently accurate for ordinary practice.

Smoke Consumers.

MANY cities have ordinances which require users to burn the smoke from their establishments, under penalty of a fine if they fail to do so. Such ordinances cannot be enforced, and any fines imposed could be recovered in an action at law, because they require an impossibility, so far as concerns a steam-boiler furnace. The authorities might as well demand that steam users burn their exhaust steam, for it is about as combustible as smoke. To demand the suppression, or at least a mitigation, of the smoke nuisance is not unreasonable, for it can be avoided to a very great extent, but it cannot be consumed in a furnace when once made. The burning of smoke and the prevention of the formation of smoke are two entirely different things. Those who are advocates of the former claim that smoke has been burnt in chemical laboratories and in experiments with kerosene lamps. Perhaps so. But it is well to remember that the average fireman is not a chemist, and that a steam-boiler furnace is not a lamp, although combustion is produced in each along similar lines. Very much can be done with furnaces as they already exist, but with some boiler settings in use difficulties will always be experienced, and with haphazard, wasteful and careless firing the same is true.

An idea prevails that any man who can use a shovel can fire with soft coal cleanly and economically, but this is a very great mistake. Persons who are applying patent smoke consumers, so called, will incur useless expense, and in the end be compelled to throw them out, scores of such failures being on record to the writer's knowledge. A great many patented devices for consuming smoke have been fairly tried and found wanting, and finally relegated to the junk shop or scrap heap, and new schemes, no better, are being introduced as fast as smoke ordinances are passed or a spasmodic effort is made to enforce existing ordinances. A little reflection should convince any one of the natural difficulties in the way of consuming smoke. Smoke is composed of watery vapor, carbon and gases in constantly varying volume and temperatures. That any apparatus can dissociate these elements and ignite them in the furnace is absurd on the face of it; they certainly will not burn combined. The only way out of the difficulty is to make but very little or no smoke, which means harmonious conditions and intelligent, systematic firing.

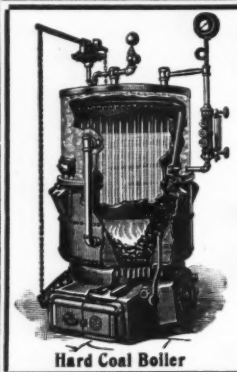
Two of the principal conditions necessary to the prevention of smoke are a properly designed and constructed furnace in prime order and a well-proportioned chimney. As a rule the stacks furnished with stock boilers are not properly proportioned. For example: An 80-horse-power boiler with eighty-two 3-inch tubes is given a stack 28 inches in diameter and 60 feet long, when it should be 30 inches in diameter and 85 feet long. Again, a 125-horse-power boiler with 132 3-inch tubes will have a stack 36 inches in diameter and 60 feet long, when it should be 42 inches in diameter and 100 feet long. These stock-boiler stacks might answer very well where the chimney gases are 700 degrees and upward—which is an undesirable and wasteful chimney temperature—but with chimney gases only 50 degrees hotter than the steam in the boiler, they could not produce sufficient draft in the furnace to burn the necessary quantity of coal per square foot of grate to give the horse-powers named above, and besides, sufficient air to promote perfect combustion and prevent smoke could not be drawn into the furnace.

Assuming that the furnace and chimney are both properly built and proportioned, and that the fuel is lump soft coal, in order to prevent smoke several things are necessary. In the first place, all of the air entering the furnace should pass through the grate and incandescent fuel, in order that it may be heated sufficiently to mingle and combine with the gases thrown off by the burning coal. Therefore a bed of glowing coals about six inches deep is what is required to accomplish this. If the air spaces in the grate are large enough, and if a sufficient quantity of air passes through a thick bed of glowing coals—reaching a high temperature before mingling with the gases—there will be no smoke. This high temperature should not be less than 800 degrees F. Give a careful and intelligent fireman a furnace in prime order, a shaking grate, registers in the fire doors, a uniform quality of lump soft coal, and a chimney of proper area and height, with a damper in it, and he should make but very little smoke, and only at firing-up time, when the furnace door is open. Registers should be put in the fire doors for this reason. No matter how careful a fireman may be, the air spaces in the grate will become clogged with ashes and clinkers to some extent, thus reducing the quantity of air passing up through the fuel. This loss can be made up by opening the registers to admit a little air above the fuel until such time as the grate air spaces may be cleaned and opened, which is very easily and quickly done with a shaking grate.

After all is said, it matters but very little whether the smoke is consumed or merely prevented, if we can only get rid of the smoke nuisance. Down-draft furnaces, when fairly treated and properly attended, have proved to be excellent smoke preventers and fuel savers; but the great expense attending a change from up-draft to down-draft, in an old plant, militates against their more general introduction.

Mechanical stokers are most excellent devices for preventing smoke and for the economical burning of fuel. With any first-class mechanical stoker no smoke should be produced after the fire is well under way, and considerable coal should be saved. If the attendant keeps the hopper constantly full of coal and removes the ashes and clinkers, that is all that is required of him—the mechanical stoker does the rest and does it well. Steam jets will prevent smoke. There is no mistake about this; but, while it costs but a trifle to install steam jets in a furnace, they are very expensive to operate, owing to their wasting a great deal of steam. Three steam jets are commonly required for each boiler, and sometimes four. Each nozzle has a one-sixteenth hole in it, and in a ten-hours' run, enough steam, at 100 pounds pressure, to run a 12-horse-power engine one hour, will flow through three of these holes. This is a great waste of steam, but where the cost of fuel cuts no figure, steam jets are the simplest and cheapest smoke preventers that can be installed. As with other devices of like kind, they require close attention, and if not properly managed they become worse than useless, because while they do not prevent smoke, they are all the time wasting steam.

There is one serious objection to the use of steam jets, however, aside from the matter of steam wastage, and that is, they are apt to corrode the fire sheets when more steam is used than is necessary, that is, when the attendant fails to shut off the steam at the proper time. Be it understood that steam jets are not absolute smoke preventers at all times, as smoke is produced when fresh coal is thrown into the furnace and until the furnace door is closed and the steam turned on. No matter what kind of device may be used to prevent the formation of smoke, if the furnace doors are opened from time to time in order to replenish the fire, smoke will be produced, because cold air rushes into the furnace and chills everything. The essential principles of smokeless fuel combustion are: High temperature in the furnace (not less than 800 degrees F.); proper admixture of highly heated air with the gases thrown off by the coal, and time to produce complete combustion of the gases. Many small details are required to combine these conditions,



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especially in a boiler furnace of the ordinary type, which is simply a box surrounding a support for the fuel, the support being sufficiently open to admit a suitable supply of air.

High furnace temperature is necessary to insure complete combustion; the higher the temperature the easier it becomes to secure good combustion, and at the same time the conditions are favorable for securing very nearly perfect combustion. The higher the average furnace temperature the less air required per pound of coal. Where there are leaks of air in the furnace and the entering air does not properly mix with the fuel gases, that excess of air is a detriment, because of the low average temperature produced. A certain amount of time is necessary, after the air is mixed with the gases of combustion, to enable them to properly combine; the lower the average furnace temperature, the greater is the amount of time necessary for the combustion to become complete before the gases strike a surface that will cool them down and prevent their further combustion.

In nine-tenths of the boiler rooms the engineers or firemen are working in darkness regarding the efficiency of their boilers and furnaces, no provision being made to measure the temperature and quantities of fuel and water, but everything is done by guesswork. Every boiler room should have a draft gauge, a few thermometers to measure feedwater and flue gases, a pair of testing tanks and a reliable scale to enable the engineers to find out what is being done. They would very soon stop up all the cracks in the brickwork of their boilers to prevent the cold air from rushing in, which is so frequently the case. With such means provided an engineer would soon discover whether he had too much or not enough grate surface, for his flue temperature would tell him the story very plainly. Fine art in fuel combustion in boiler furnaces, and smoke prevention, can sooner be reached by the use of sensitive indicating instruments that will show what is taking place inside the furnace than by the means now employed.

D. B. Dixon, in the American Manufacturer.

POPULATION AND SANITATION

ITALY, at the beginning of the new century, affords a striking illustration of the effect of sanitary reform upon population. That country has lost by emigration fully 5,000,000 people during the past twenty years, and yet last years census shows an increase of population that is somewhat surprising. The estimated population was 31,000,000, but it turns out to be 35,000,000, and the ratio of increase is high, approaching four-fifths of 1 per cent. a year. The increase since the last census, that of 1881, is nearly 7,000,000, or 25 per cent., and it is explained that this increase is due to improvement in public sanitation and the consequent lessening of infant mortaliy. It may not be generally known that the Italian medical schools are among the best in the world, and that the Italians have developed a singular capacity for hospital organization and management. The Government has also undertaken or sanctioned great movements for sanitary reform. By introducing a good water supply, closing the old wells, and flushing the streets. Naples was raised in twenty years from the position of one of the world's unhealthiest cities to that of one of the healthiest, and the case of Naples is said to be typical of what has been happening throughout Italy.

IN Schools and Colleges, owing to the absolute neccessity of renewing the air to insure healthful conditions, they require a system of heat-regulation that is accurate. Failing in this respect the result invariably is sickly students and staff.

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Hospitals for Contagious Diseases and Their Ventilation.

BY THOMAS BARWICK.

HOSPITALS for contagious diseases should be built of fireproof materials. The cruciform plan should be considered as the best for such a building, or they should be built with provision for the administrative portion at the center and radiating wings for the wards and sick rooms.

The building should be arranged so that at one point, either front or rear (preferably the rear), the reception of the patient being provided for without being brought in contact with the administration offices of the building. Arrangement should also be made so that the patient may be quickly transported to the various wards or confining rooms, either by means of an elevator or graduated stairway, without passing through any of the administration portion.

The design for such a building would be two stories in height, the sick wards being placed on the upper story and the convalescing wards or rooms on the first story. The basement portion of the administration part of the building should be arranged to receive the mechanical plant for the heating and ventilating, and other requirements, the wings being left for the heating and ventilating ducts, etc.

The first story of the administration portion should be arranged for the administration uses only, the second story for operating rooms, etc., in connection with the wards. The floors throughout the building should be of granolithic; the walls on the inside should be of glazed brick, terra-cotta, or tile, so that they may be washed down at any time. Partitions should be constructed in a similar manner, and the doors and window sash should be made of iron, or covered with metal, and as little paint as possible should be used in the building.

The first floor should be arranged with individual rooms or double-occupant ward. In no case should the wings extend beyond six beds in depth, allowing for twelve occupants in the ward, with a preference for smaller wards than the above, so as to isolate the different diseases as far as possible. There should also be a preference for wards on the second story with ante-rooms, baths, toilets, etc., arranged adjoining the administration portion, and separated by proper closed vestibules. The building should also be provided with its own domestic machinery, such as cooking, laundry appliances, etc.

Such a building should be built with proper elevation above the surrounding country to give it a free and clear drainage from any surface water that may interfere with its foundations, or percolate through the floor of the basement.

The heating and ventilating apparatus should be confined to the basement portion in the wings. The building should be arranged to be warmed by a system of heating stacks placed on standards and enclosed in galvanized iron at the foot of the vertical flues in the basement, and arranged with double dampers, so that at any time if a higher temperature is required in one room or ward, the same can be secured through the medium of warm air, the air passing into the various rooms through large plain fretwork grills. Each room should have a thermostat with a wide range, so that the temperature may be maintained to suit the conditions.

The air supply should be brought from a point as far from the general building as possible, so as to provide for uncontaminated air, and should be forced through the rooms by means of a blower driven by any motive power that may be adapted to the work.

The air supply for such a building should be carried up in the walls through terra-cotta flues and enameled or glazed on the inside so as to be germ proof as far as possible, terminating in the rooms at a point say eight feet above the floor line, so as to provide for the distribution of air through the rooms without drafts upon the patients, and in the wards the inlets should be as near as possible between the beds.

The velocities of air entering into the rooms should be extremely low, if possible, not over 250 feet per minute for any current of air entering the room, and should be tempered at the inlet of the fan by means of a tempering coil controlled by the thermostats to a temperature of 65 degrees maintained by thermostatic regulation, and the additional heat supplied by the stacks at the foot of the flues.

The fan for doing this work should be constructed so that there will be no noise, and should be of large size so as to run at a low velocity. The arrangement of the heating apparatus, including the piping, radiators, tempering coils and the boiler, should be of ample size to maintain the building at 70 to 75 degrees under all conditions of weather, with sufficient reserve in all of the indirect stacks used as reheaters, to increase the temperature in any room from 80 to 85 degrees. The boiler capacity for domestic use should be provided as well as for the heating. This could be accomplished by means of two boilers, and as far as possible there should be a duplication of parts of the system, so that should any portion of the apparatus become out of order, it would not necessitate the closing down of the building.

In supplying air to such a building it is necessary to have a very large volume, so that the percentage of vitiated air will be kept to a very low degree. For buildings of this class I should recommend not less than 5,000 to 6,000 cubic feet of air per hour for each occupant; that is, to each individual in a room. The administration portion of the building could have slightly less than this amount, but my preference would be for the full volume throughout all portions of the building.

The vitiated air from the various rooms should be collected through vertical flues carried down to the basement connecting into sealed ducts formed of brick or terra-cotta, and the inside of each flue should be enameled or finished in similar manner to the heat flues. Each wing should be entirely independent of the other, and the vitiated air ducts connected into vertical uptake shafts (or they may be carried down to one central point to a vertical shaft), carried far enough above the top of the building so that the discharge from the shaft will not contaminate the air in the neighborhood.

The vitiated air should be collected into a receiving chamber at the foot of the vertical uptake shafts or shaft and passed through a disinfector, in which the air should be burned, either by means of coke fire or a furnace especially designed, or by highly heated steam coils, a jet or spray of steam being introduced into the chamber so as to destroy the disease germs as far as practicable, in the same manner as clothing is disinfected by means of steam disinfecting chambers, or the air could be passed through one of the well-known disinfecting tanks that are at present in use in various parts of the country. By these means we may be able to destroy the live germs passing through the air.

Sweepings and dust from these rooms should also be conveyed to this vertical uptake shaft, either by means of a blower or by an induced draft in the vertical shaft. Perforated steam pipes could be introduced in the main air supply ducts and in the vent ducts and vertical flues where possible, so that the entire space may be flooded with steam.

Read before the American Society of Heating and Ventilating Engineers.

Humidifiers should be placed in each room and automatically regulated. The windows in such a building should be sealed in such a manner that they cannot be opened to the outside air, dependence being placed upon the heating and ventilating apparatus.

Provision should also be made for the fumigation of the rooms by such means of fumigation; by formaline or other disinfectors as are at present in use and found adaptable. Each room could be separately treated through the supply and vent flues by using proper dampers.

Water should be introduced (both hot and cold) into each of the wards and rooms, so that the walls, ceiling, and floors may be thoroughly washed down. As far as possible, the ventilation from the rooms would be best if taken near the floor, as the tendency for the heavier bodies and small particles of clothing, etc., is to settle at the floor line; therefore, they will be conveyed by the air current to the various outlets and thence to the disinfecting chambers. Clothing should be thoroughly disinfected in disinfecting chambers placed in each of the wards or wings before being taken to the laundry, these chambers being located at some point accessible to each ward independent of the administration portion of the building.

Such buildings can be built in cities where the population is crowded, or situations that are of limited area in their districts, without fear of contagion to any portion of the surrounding country.

Some of the buildings that I have investigated have been frame structures, many of them being supplied with simple direct heating apparatus, the radiators being placed in the rooms, and no proper provision being made for the supply of fresh air or ventilation. The studding of the building was constructed of wood and plastered, with the idea that the occupancy of the building would be temporary, and so that any time the building may be burned or destroyed; but the general run of these buildings have been in use from twelve to thirteen years. Through improper care and lack of funds, the buildings have become permeated with vermin and bacteria, and as the buildings are constructed with no proper provision for ventilation or supply of fresh air, they are entirely unfit for the purpose designed. Some of these buildings have small ventilators placed in the ceilings, connected with cowls on the roofs, emptying into the surrounding air without any provision to destroy the germs in the vitiated air, and allowing the same to escape to the surrounding atmosphere, thus creating an actual nuisance.

In buildings for this use it should not be considered that the cost of construction or cost of operation is the first requisite for such a building. The general health of the public should be considered first and above all other circumstances. The cost of maintenance of such buildings, as before described, will be considerably beyond the cost of those that are now constructed in some parts of the country, but the menace to the public health where the cheaply constructed buildings are used, is a constant dread at all time; therefore, I should recommend that for contagious diseases, buildings should be constructed with proper ventilating requirements, and so that they may be entirely fumigated and cleaned without any possibility of contamination.

The Heating Value of Fuel.

WHY is one pound of coal worth more or less than another, and which of several samples of coal is worth the most for fuel purposes? These are questions with which the engineer is often confronted, and the answer is often difficult to give, even with all the help which modern science has to offer.

It should be understood that a fuel is a substance containing carbon and hydrogen in varying proportions, and ready under suitable conditions to combine with oxygen. It is in this act of combination with oxygen that heat is developed, and the fuel thus becomes of use for the purpose desired. Carbon and hydrogen are, however, far from having the same fuel value. One pound of the former under perfect combustion would develop about 14,500 units, while a pound of the latter under like conditions would give about 62,000 heat units, or more than four times as much per pound.

The heating value of a sample of coal or other fuel depends, therefore, in large measure on the relative proportions of carbon and hydrogen. A fuel rich in the latter may be expected to have a high heating value, and vice versa. The value will also depend on the amount of non-combustible matter or ash which is present, and on the nature and proportions of various other ingredients which may be present in small amounts. Chief among them are sulphur, iron pyrites, alkaline earths, and water vapor.

Since the heating value of a fuel must in a way be fixed by the substances which it contains, it might be thought that the simplest method of determination would be by means of a chemical analysis which would give the proportions of the carbon and hydrogen and of the other chief elements in the composition. Unfortunately for this, however, the heat developed in the combustion of a fuel is found to depend apparently upon the manner in which these various elements are combined, and in which they break up and recombine with themselves and with oxygen in the process of combustion. Many of the details of this process are still somewhat uncertain in character. Science has not yet succeeded in unraveling the exact nature of some of these steps, and until this is done it will not be possible to accurately determine the heating value of a fuel from a knowledge of its chemical composition. Still, this knowledge is always of great value in connection with a fuel, and through such means at least a fair approximation may be made to its heating value. Into the details of the operation we cannot here enter, but the determination is based upon the repeated scientific determination of the heat developed by the perfect combustion or union of carbon and hydrogen with oxygen, and on certain assumptions which are made regarding the details of the chemical process. To sum up, then, for the chemical method, it may be said that an analysis of a fuel is always of interest and value in estimating its heating quality, and that a good approximation may usually be made in this way to its true value. The chief objections, aside from this element of uncertainty , are found in the fact that the services of a chemist are usually necessary, and considerable time, as well as expense, may thus be involved.

In the calorimeter method, the sample of coal is put through the actual operation of combustion in a closed vessel known as a calorimeter or heat meter, the oxygen

required being usually provided in the form of pure gas. The heat thus developed is then measured in various ways, and certain corrections for the instrument are applied and the result is taken as the measure of the heat to be obtained from the sample in question. With the apparatus in hand this method is quickly and readily applied, and with some experience and care in attending to the details of the operation will give fair results, especially for comparing a series of samples where the absolute value is not of so great importance as the relative.

The chief difficulty with this method is found in the fact that, in common with all measurements of heat, great difficulty is often experienced in getting rid of all the sources of error, and in making sure of regular and consistent results. It is often the case that puzzling differences will arise and sometimes of such amount as to throw suspicion on the observation as a whole.

To sum up for this method we may, therefore, say that the heating value may be determined quickly and with fair accuracy, but the necessary equipment as well as some training in such work are required. At the same time, the needed equipment and training are much less than in the case of a chemical analysis. As between the two, the method by calorimeter is more readily available for the engineer, is much quicker, and will presumably give better results than an attempt at analysis.

This general subject of the measurement of the heating value of a fuel should receive more attention from the engineer than has usually been given it. The day is past when we can afford to judge the value of a sample of coal by merely looking at it. The urgency felt on every hand for increased attention to details which may effect economy demands some method of estimating quickly and with fair accuracy the heating value of a given fuel. There is no reason, indeed, why a fuel should not be bargained for on the basis of its heating value. It is heat the engineer wishes to buy, not ash or slag, and the fairest possible basis for the adjustment of the price per ton would be found in the heating value per pound.

Other elements, it is true, must enter into the practical question of the value of a fuel. Such are, for example, its mechanical condition and its tendency to break up into particles too small to be economically and efficiently used; its quality as a coking or non-coking coal; its tendency to form slag and clinker; the readiness or otherwise with which it may be burned under any specified conditions. Such like considerations must often be given due weight in settling the value or availability of a given fuel, but, nevertheless, the heating quality is chief of all, and we may look for an increase in the attention given to its determination, as we are more sharply driven to the study of the conditions affecting economy, and the avoidance of all sources of waste.—The Engineer.

An Architect's Views on Ventilation.

THE science to supply fresh air to house humanity during cold weather, and the proper removal of vitiated air from all classes of buildings, is a subject which in these days of advancement in Hygiene does not in all cases receive due consideration. It has not kept step with the general lines of progress, and in many instances is seriously neglected and also ignorantly applied.

While it is generally known that in public and private assemblies, crowded office rooms, factories, etc., the atmosphere is breathed over and over continually for hours, yet the mangnitude of evils arising from respiration of vitiated air is known to a comparatively limited number of individuals. The medical fraternity is well aware of the baleful results of breathing in impure air and exposing human life to injurious draughts; and according to statements of eminent physicians, which is by no means exaggerated, 50 per cent. of fatal cases of diseases are indirectly due to these causes.

A true appreciation of pure and wholesome air, congenial to the lungs, however, will probably not be obtained until through our schools and colleges the fundamental physical principles and laws of health shall have been inculcated into the great mass of the community. When this is obtained, compulsory ventilation for all private and public buildings, schools and factories where numbers of people congregate for hours, will no doubt become a fact, as the laws now in existence against the adulteration of food products. Suitable ventilation for all classes of buildings is in every instance a necessity to maintain the faculties of healthy persons. The absence of a supply of fresh, pure air and the long exposure in vitiated atmosphere results in depressed energy, sickness and disease.

In one instance of a force of seventy odd clerks crowded into one large room, which had no independent air supply except a periodical opening of the windows, from 10 to 15 per cent. of their number were continually on the sick list. It frequently happens that physical exhaustion would overcome one or the other of the clerks, in consequence of which the room was finally provided with an adequate supply of fresh air. The result was surprising, as not alone was the sick list reduced to about 2 per cent., but the working capacity of the force was considerably increased. Whereas under former conditions the daily quota of work would not be finished until about 5 P. M., under the changed condition the same amount of work would be completed before 3 P. M.

Hygiene laws require that the air of occupied apartments of any building should be of the same conditions as the outside atmosphere. This, however in practice, is hardly attainable, as actual results have proven that air of a room is vitiated much more rapidly than such vitiated air can be properly removed. Neither is it advisable to have the volume of air supplied to a room exceed 5--6 times its contents, as otherwise objectionable draughts may under certain conditions be unavoidable. One of the principle obstacles to the proper consideration of hygiene requirements of buildings as to ventilation is, however, the cost of the required arrangements.

Sixth Annual Convention of the Indiana Master Plumbers' Association.

MARION, the Queen City of the Gas Belt, had the honor of entertaining the sixth annual convention of the master plumbers of Indiana on Tuesday and Wednesday, March 11 and 12. It was both a tribute to the attractiveness of the convention city and a sign of the rapid growth in membership and the commendable loyalty of the association members that the attendance at the association this year exceeded that of any other convention in number, while a glance at the roster shows that the attendance was representative of all the interests of the plumbing trade in all corners of the great state of Indiana.

The pleasure of extending to the association the official welcome to the city on behalf of the local association and the city officials fell to the lot of W. F. Gillespie, vice-president of the state association and president of the Marion local. Shortly after the convention had been called to order by President Highlands on Tuesday morning Mr. Gillespie was given the floor and spoke as follows:

"Mr. President, and Members of the Master Plumbers' Association of Indiana:

"It is my privilege and pleasant duty, on behalf of our local, to extend to you a cordial and hearty welcome; and, on behalf of our mayor, the freedom of the city.

"It is needless for me to make any excuse to you for not being a public speaker; you will realize that soon enough. I must confess that, when I realized that we were to entertain this honorable body, I felt some doubt as to our ability to entertain as generously, royally and acceptably as you have been entertained on former occasions—it having been my privilege to be present at the last two conventions. The precedent established by them, in order to keep in sight, would require us to get a jig-time movement. We are, however, glad to say we welcome you to the Queen City of the Gas Belt (with the gas left out), a city that has a marvelous growth; a wide-awake, up-to-date, progressive city; her citizens imbued with the spirit of enterprise, such that nothing short of an epidemic, earthquake or panic could impede her progress. I hope that we shall be able to so impress each of our members that they will leave our city with kindly feelings and good impressions of Marion and her citizens. It is my desire that each member give his presence and personal attention to the business of the meeting, and that it will result in much good and great benefit to us all, and that we shall agree that it is good to be here.

"Being president of our local the past year, the appointment of committees for your entertainment devolved upon me. In selecting them I have tried to get them in their proper places, placing as chairman of the entertainment committee a gentleman you all know—prince of good fellows, a natural entertainer, and a friend of everybody—Mr. David Murphy.

"We have provided some refreshment, to which you are invited, and it is as free as the air you breathe. I will leave to Mr. Murphy the announcement of how we will entertain you.

"Thanking you for your kind attention, I again extend to you a hearty welcome."

In response to a general call for Mr. Murphy, President Highlands called that gentleman to the floor and he delivered on behalf of the entertainment committee a stirring address of welcome. Mr. Murphy is known by his friends in the association for his ready wit and his gift of oratory. In Marion and vicinity he is much in demand for parlor and amateur theatrical entertainments because of his clever impersonations, and has received many flattering offers to drop the plumber's kit and go on the professional stage. His popularity among his fellow members of the association was attested by the enthusiasm with which they received the following speech:

"Mr. President, and Members of the Association:

"Allow me, please, to state that I have been appointed chairman of entertainment. One year ago, when I was called upon, in response to the stated pleasure and honor bestowed upon the local of Marion, when then and there you granted us the pleasure of the 1902 meeting, I promised on that day and date that we should leave no stone unturned to make your visit one long to be remembered, and to write its name in the history of this association." At this statement it was raining in torrents. Mr. Murphy looked through the window, and said, with a smile: "A year ago I did not know it would be raining to-day"—(applause)—"but that is God's goods, and out of my jurisdiction." (Applause). "Nevertheless, you shall be entertained. This evening at 4 o'clock we will take our chartered train of interurbans for a visit to our National Soldiers' and Sailors' Home, to view the points of interest. After our return there will follow an intermission for dinner. The evening number will consist of a visit to our new theater, known as The Indiana, of which we

H. H. HIGHLANDS.

are very proud. There you may view the skill of architecture, accompanied by a programme of extravaganza, entitled 'The Belle of New York,' which, I hope, will leave nothing to be desired.

"Gentlemen, I assure you we are pleased to see so many present, and give each and every one a hearty welcome, and only hope that at our next annual meeting the same well-behaved gentlemen will be present, accompanied by many new smiling faces.

"Wishing you all success, joy and happiness, we remain, lovingly, etc."

President Highlands accepted for the state association the many hearty expressions of welcome, and when the enthusiasm which followed upon this exchange of brotherly courtesies had subsided called the attention of the meeting to the volume of important business to be transacted and the necessity for paying strict attention to business until this had been disposed of.

The balance of the morning session was given up to organizing the forces of the convention and oiling the machinery of committees to transact the routine work of the convention.

The credential committee's report showed an exceptionally good representation in attendance, the official roll call being responded to by the following delegates:

Alexandria—J. C. Brittain, R. J. Duthie, A. R. Fairfield, W. B. Leeson & Son.

Anderson—Daniels & Osborne, McCall & Worden, Powell & Dorste.

Bluffton—A. J. Tribolet, National Straw Hat Displayer Co.

Brazil—O. C. Hawkins.

Cambridge City—W. H. Kiser.

Connersville—F. W. Huxtable, C. L. Huxtable.

East Chicago—James Clements.

Elwood—J. H. Wagner.

Fairmount—Driggs, Miller & Co.

Frankfort—C. H. Condon, M. E. Elder, W. H. Emshoff, Charles W. Smith & Co.

Fort Wayne—C. C. Fox, H. F. Franke, A. Hattersley & Sons, John & Meyer, Emmett Martin, Martin F. Noll, Albert Rolf, Robert Spice, P. J. Zimmerly & Co.

Greensburg—Corbett, Rohe & Gaines, Mendenhall & Spillman.

Goshen—Charles F. Kutz.

Hartford City—W. E. Campbell, C. H. Wingate.

Huntington—S. Buchanan & Co.

Indianapolis.—C. Anashaensel & Co., Thomas Connell & Co., Freaney Bros., George A. Geis, Herman A. Goth, B. Gundelfinger, Healey & O'Brien, Jos. F. Haslinger, Hayes Bros., Herman & Rothrock, Holmes & Co., Charles Holtman, Kirkhoff Bros., C. W. Meikel Co., Mock & Cook, E. A. Strong, Wilcox & Judd.

Kokomo—Bennett & Turley, Higgins & Sullivan, J. O. Lindley.

Lafayette—R. A. Hawkins, Lane-Pyke Co., Cornelius O'Neill, Overesch & Werkhoff, A. R. Schmitz, Wallace Bros. Co., H. M. Wheeler & Co.

Logansport—George H. Asire, Linton & Graf, William Whitehead, J. H. Rodefer.

Marion—William F. Gillespie, S. D. McClain, H. W. St. John, C. S. Beshore, M. F. Hegarty, John McDonnell, D. H. Murphy, Swanger & McClain, J. R. West, L. M. Whisler & Sons.

Montpelier—C. H. Chaney.

Muncie—J. P. Gragos, J. A. Gallivan, R. I. Hoyt, H. H. Highlands, Jones & Clevenger, Lore & White, F. W. Stauf, Phil Stauf.

New Castle—New Castle Machine Works, E. F. Scott.

Peru—Fleger & Brennan, C. S. Picard, E. E. Reilly, William H. Shingler, Charles Soames.

Portland—Yount & Ewry.

Richmond—W. C. Bass, Zoller & Craigshead.

South Bend—D. A. Westbury, Jos. Aslin, H. B. Blair & Co., Thomas Williams.

Terre Haute—Freitag & Weinhardt Co.

Wabash—Hipskind & Hipskind.

Warren—James O'Neil.

The business sessions of Tuesday afternoon and Wednesday were wholly given over to the transaction of executive business, such as the consideration of complaints against supply houses for selling "out of bounds," the adjustment of differences between individuals and local associations, and the hearing of the reports of officers and committees.

A very comprehensive report was offered by President Highlands, and this report formed the basis for action by the association along the lines recommended by the president. Following is the president's re-

port, abbreviated by the cutting out of all matters of purely local interest:

Muncie, Ind., March 11, 1902.

To the Officers and Members of the Indiana State Association of Master Plumbers.

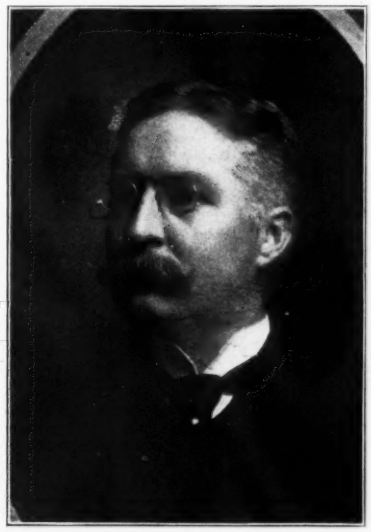
Gentlemen: In submitting to you my annual report, I do so with the most grateful feelings toward our members for their loyalty and support, and for the many expressions of good-will and offers of assistance.

The greatest fault with some of the members is that they pay so little attention to answering letters sent from this office, and I find that my predecessors have had the same thing to contend with. A letter sent you from the president's office may seem to you to contain matters of very little importance, and yet it might be of very much importance to some other member, or to the State Association. I request each and every one of you to give this matter more attention, and to answer all letters promptly and fully, always bearing in mind that the welfare of one is the welfare of all, and that the president is only the presiding officer of this association, and can do things for you only as you help him to do them.

You will remember that my term of office commenced with a very chaotic state of

DAVID HANNAFORD MURPHY.

affairs. Our State, with many others, was asking for a repeal of the New York conference resolutions, or their amendment in such a form as would give us relief from the constant violations that some of the jobbers were making under that agreement. The National Convention at Kansas City reaffirmed the agreement, provided the Confederated Supply Associations would enforce their part of same, with all the understandings under which they were adopted. After we did this the violations were more flagrant than ever. If the Supply Associations had been willing or able to enforce them fully, we would have had an almost ideal agreement. But they were either unable or unwilling to do this, and they utterly failed to carry out their part of the agreement. We were being taken advantage of by the cupidity and dishonesty of certain of the jobbers and manufacturers, and it was impossible to get the Confederated Supply Associations to enforce the penalty on the violators. In view of all this, President Hornbrook notified the secretary and national committee of the Confederated Supply Associations, on September 20, that our association would no longer be bound by the agreement. A meeting of our National Executive Committee was held in Cleveland on October 8, which I had the pleasure of attending, and we there adopted the Cleveland resolutions, under which we are now working. I am confident that you will all find them all that we desire, if we all do



W. J. FREANEY.

our part toward enforcing them, and living up loyally to their terms. In these resolutions we declare ourselves in favor of buying our supplies only from those who sell goods only to those whose names appear in our National Directory of Master Plumbers, and that this directory be furnished to the manufacturers and jobbers for their guidance and that we also issue to our members a directory of the firms who are in accord with us, and are living up to our resolutions.

Now, let me caution you about the purchase of goods and the use of the directory: Do not under any consideration buy any goods from any one unless the name appears in this directory. If the name is not there, it shows that the party is not friendly to us, and is violating our resolutions. If the manufacturer or jobber is doing the right thing with us, you may be sure that his name will appear on the directory; and if it is not there, there is a good reason for it. If you are in doubt as to the standing of any one who wants to sell you goods, consult the directory. You will find that some of these violators will come around and offer you a special low price on some goods, just to get you to break our agreement, and you may think that just to buy one bill of goods of them would not cut any figure, and no one would find it out.

I am glad to say that, at the time last fall when I had occasion to test the loyalty of our members by issuing a blue sheet, I was highly gratified to find that our members lived up to it so closely as a body. But I also say it, with shame, that I also found some who declared that they would buy their goods from whom they pleased, regardless of the blue sheet, and they did so. Do not think that I do not know who they are, for the jobbers who sold them the goods were very careful to let me know that they were selling to our members who were not loyal. These same members are the first to register a big kick, and want prompt action taken when their toes are tramped on by the jobber. Such a man should not be a member at all, and we are better off without such an one. So soon as a jobber who is not in accord secures an order from one of our members he immediately flaunts it in the face of our officers, and says, "There is one of your good members." This is not an imaginary case, for I have had it happen.

I have devoted a great deal of my time personally toward organizing the State, and getting it ready for this policy, but, as I could not find the time to visit the whole State, there are still a number of towns where we are not organized, but this will make no difference in our policy, as we only demand protection where we have members. The violations occurring in the past year have been numerous, but, on account of the condition of affairs, I tried to smooth all of them out in the easiest possible manner. Most of the violations have been settled through my office. One manufacturer paid to me $25 for a small violation, which amount was paid to the local association where the sale was made. Most of the violators have been let off with the promise from them that they would do better, and I am glad to say that they have been living up to their agreement in pretty good form. Where I could not exact such a promise from them, the matter was referred to our National President.

On the advice of our executive committee, I attended the meeting of the Inter-State League in Minneapolis, on Feb. 21, and succeeded in having Indiana admitted as a

H. A. GOTH.

member of the League, which is now composed of Illinois, Iowa, Wisconsin, Minnesota and Indiana. The cost to us of this League will be small, and the time may come when we will need this League badly, and I think it is good policy "in time of peace to prepare for war." I hope this convention will ratify my action in having this State admitted into the League.

The association was formed for the purpose of taking in every legitimate plumber who applies for membership, and not only that, but they should be solicited to join. Each new member adds strength to the association, and without this membership and strength we are powerless to enforce our demands upon the jobbers. I find that in some places the local members go on the theory that, as they are now already formed, they will admit no more members, and will, in this manner, keep all the plumbing work in their city in their own hands. This is a very unwise policy, as each shop on the outside will be a thorn in your side, and will only be a source of trouble to yourselves and the State at large. You can always control

a shop much easier on the inside than on the outside. Get rid of this narrow-minded policy and conduct the affairs of this association on the broad lines upon which it was formed.

I am glad to report the following increase of membership during the past year:

Number of new members taken in..... 61
Number of members retired from all causes.. 13
Number of members now in good standing 198
Net increase in membership during the year 48

Eight new locals have been formed during the year in the following places: Elwood, Frankfort, Hartford City, Kokomo, Lafayette, Logansport, Peru and Terre Haute. All of these have been organized in person by myself, except Peru, which was formed by Byron E. Hattersley, and Terre Haute, which was done by correspondence.

On August 10th our treasurer, J. Milt Retherford, tendered his resignation, which was made necessary on account of disposing of his plumbing business, and since that time I have taken care of the duties of that office, in connection with my own.

In conclusion I wish to thank all our members and officers for their assistance, and ask that you give to the incoming president your hearty loyalty and support, for without the same he can be of little service to you. Yours truly,

H. H. HIGHLANDS,
President.

Perhaps the most important recommendation of the resolution committee resulted in the ratification by the state association of the action of the national executive committee in rescinding the New York conference resolutions and adopting the so-called Cleveland resolutions. Expressions of entire confidence in the national officers and assurance of hearty support were also embodied in the vote of the convention.

David A. Westbury, ex-president of the state association, presented on behalf of his colleagues on the sanitary committee a very able report on this important branch of the association's work, and earned the hearty approval of the association. Following is the report in full:

Mr. President and Gentlemen of the Convention:

The santiary committee has to report that nothing of importance has been accomplished during the last year owing to the fact that your committees have not been able to meet the past year and review the situation, which is a serious one for us to grapple with. Your sanitary committee by letter agreed upon the following report:

Since the State Association was first organized the work of this committee has chiefly consisted in the preparation of a report, usually very brief, concerning sanitary matters in general. No particular field of investigation or action was ever given. Moreover, satisfactory information in regard to the sanitary conditions of the many cities and towns represented here, especially as related to our own trade, was not available. So it is not surprising that our usual reports embodied little that was of permanent value. But the time has come when we, not the sanitary committee alone, but the entire membership of this association, ought to make a change in its general working methods, so that we may render each other and possibly the public at large, services of real value. Having carefully considered the matter, your committee decided to take up in this present report the important subject of sanitary legislation, dwelling for a moment upon the needs and opportunities of the association in this report.

Fortunately for the cause of sanitation boards of health have been appointed in very near all the states. In most cases, though not in all, the plumbing trade finds in these boards willing co-operation when trying to secure local or state laws governing plumbing. It is in regard to these laws that we are especially desirous of speaking to-day. The contribution that they make to public safety, to the welfare of the trade and to the protection of its individual members is constant and increasingly valuable.

Within the past few years various states have secured good plumbing laws. We earnestly recommend to the members of our trade in cities and towns, not yet possessing similar legislation, that they should use every endeavor to secure it as soon as possible. This is surely one way in which we can serve the cause of sanitation in an effective manner. No other trade stands in such intimate relationship to the public health, according to the intelligence and skill with which it is practiced. Hygienic conditions are to a greater or less degree secured and defended. Dangers are averted that without our efforts would threaten serious injury to life and health.

Our first recommendation is in this connection. We all need more and more definite information in regard to actual sanitary conditions existing in the many cities represented here, and fortunately to furnish this knowledge the State Association has ample opportunities and every convenience. Without the general information, it is next to impossible for a committee, however able or energetic, to present special problems for the consideration of the association, or to map out lines of work to be taken up in the interests of sanitation. Therefore we would recommend: That the president, or executive committee, send a circular letter to each president of the locals in the cities, also to individual members asking each to answer as fully as possible a set of questions concerning his particular city or town. Such a letter might read as follows:

Dear Sir: The State Association of Master Plumbers desires to obtain accurate information in regard to the sanitary conditions existing in your city, especially as affecting the plumbing trade and the general conditon of the latter. For this purpose a list of questions has been prepared to be answered by each local president or individual member and forwarded to him by the executive committee, state president, or state secretary, as the association may direct. Kindly collect the necessary information regarding this subject, in your city, and forward results as soon as possible to the state president. Yours truly, ———.

P. S.—Please find enclosed a list of questions to be answered.

This is of course merely a suggestion to be altered or rejected, as this association may see fit.

1. Has your city a sewerage system? What proportion of the inhabitants are using said sewer?
2. Have any serious epidemics occurred in your city of late years?
3. What was the death rate in your city during 1901—or 1902?
4. Mention any noteworthy improvements in regard to drainage or similar problems which may have been introduced recently into your city.
5. Have you a good water supply?
6. In general, is the system of drainage hampered or aided by natural conditions?
7. About how many master plumbers are there in your city and what is the general condition of trade there?
8. Have you any laws governing plumbing? Have you a plumbing inspector? If so, is he a practical plumber?
9. Have you a local association?
10. State briefly the most pressing needs of your city from a sanitary standpoint.

Answers to these questions might be sent to the local president, secretary or executive committee. These should be answered at the members' earliest convenience after receiving letter, in order that they may be classified, condensed, and arranged in convenient form, and in this way the State Association will be accurately informed as to what will be necessary for state legislation. A last recommendation is to the effect that members of the State Association take a greater interest in sanitary literature of general importance, the reports of our state board of health, pamphlets or reports upon recent epidemics or articles concerning other sanitary developments, will be found of much interest, and ought to be more widely read. They will help to keep us in touch with the times, and will inform us in regard to matters which for many reasons it is good and desirable for us to know.

We take pleasure in commending highly the excellent service rendered by our trade press, in this as in other respects. Their articles treating on sanitary measures and appliances are always well written and up-to-date, and should be appreciated as they deserve. Also too much praise cannot be given the manufacturers of plumbing material for the great advance they continue to make in sanitary appliances. They have rendered much service to the trade and to the public in developing and perfecting plumbing fixtures and to the beauty and art of their productions the trade is greatly indebted for the present high standard of sanitary plumbing.

In conclusion your committee calls to mind the fact that one of our principal objects in view when this association was organized, was to create and maintain a sanitary code, yet how many of the vast army of plumbers throughout the state, having the fronts of their respective places of business embellished in letters of gold with the words "Sanitary Plumbing" understand what is meant by the term.

Alas dear friends, if an examination were made on these matters, we are afraid the number who would pass the ordeal successfully would be very small indeed, whereas their standard should be as high as the latest developments of science might prescribe. We need not remind you how well this object has been attained in the past, it only remains for the association to continue to exert the great influence for the advancement of sanitary science. Persuaded that as it is our duty and privilege to be among the foremost workers in this good cause, we should do all in our power to prove worthy of the trust confided to us,

Respectfully submitted,
W. W. WILCOX,
D. A. WESTBURY,
F. J. ZIMMERLY.
Committee.

William J. Freaney, chairman of the legislative committee, presented a verbal report of the work done by his committee, and while the success of their efforts is not all that could be desired, Mr. Freaney is far from discouraged and believes that by the same quiet and dignified methods which have removed much of the prejudice against a state plumbing law the association will yet be able to remove from their beloved state the reproach of being almost criminally negligent of the health of her citizens. In Indianapolis a plumbing ordinance has twice been brought up for passage and all but succeeded in getting through. Mr. Freaney believes a third effort, now under way, will be successful. Reports from other parts of the state show that the association members are accomplishing locally what the association as a whole has not been able to accomplish for the good of the whole state. Several excellent plumbing ordinances have been passed in the smaller cities of the state and are now in satisfactory operation.

The closing order of business on Wednesday afternoon was the election of officers and the appointment of committees for the

ensuing year. President Highlands' objections to accepting a second term in that important office were overriden by the convention, the delegates agreeing to a man that Mr. Highlands owed it to the association to accept a second term in order that the methods which have brought such success in the past year might be carried to a logical conclusion to the benefit of the whole craft. The convention simply refused to listen to the objections which Mr. Highlands raised, and he was, with much reluctance, obliged to accept. It was a magnificent testimonial of the appreciation in which Mr. Highlands' efforts on behalf of the association are held by his confreres.

The same enthusiasm marked the unanimous vote of the convention for the following officers:

Vice-president—H. A. Werkhoff, of Lafayette.

A GROUP OF DELEGATES TO THE SIXTH ANNUAL CONVENTION OF THE INDIANA MASTER PLUMBERS' CONVENTION AT MARION, MARCH 11 & 12.

Secretary—F. W. Stauf, of Muncie.

Treasurer—Chas. Anashaensel, of Indianapolis.

Executive Committee—W. F. Craighead, of Richmond; David A. Westbury, of South Bend, and Geo. F. Kirkhoff, of Indianapolis.

Delegates to National Convention—D. H. Murphy, of Marion, and W. F. Craighead, of Richmond. Alternates—W. J. Freaney and J. M. Healy.

The president later announced the appointment of the following standing committees:

Legislative—W. J. Freaney, Philip Stauf and E. A. Strong.

Sanitary—J. F. Haslinger, H. J. Hayes and Mr. Mock.

David A. Westbury, of South Bend, acted as spokesman for his local association and extended to the association an invitation to meet in South Bend in 1903, giving many reasons why a visit to South Bend would be pleasant, profitable and instructive to those who attended the convention. The invitation was unanimously and thoughtfully accepted.

The closing order of business was the passage of a vote of thanks to all of whom the convention was indebted for courtesies extended. Miss Reynolds, a local stenographer, who had kindly consented to take the minutes of the convention in the default of the official reporter, was given a special vote of thanks and responded in a neatly worded note which was read for her by the chivalrous Healey. Needless to say the vote of thanks extended to the local association was expressive of keen appreciation, while the city authorities and the local and trade press received similar expressions of gratitude.

Regarding the programme of entertainment your scribe has said little up to this point for fear of forgetting in his enthusiasm for Marion's hospitality the real purpose of the convention, the transaction of association business. He now turns gladly to the social features of the convention and regrets that lack of space—the bugbear of the reporter's existence—forbids his giving this part of the story the attention it deserves.

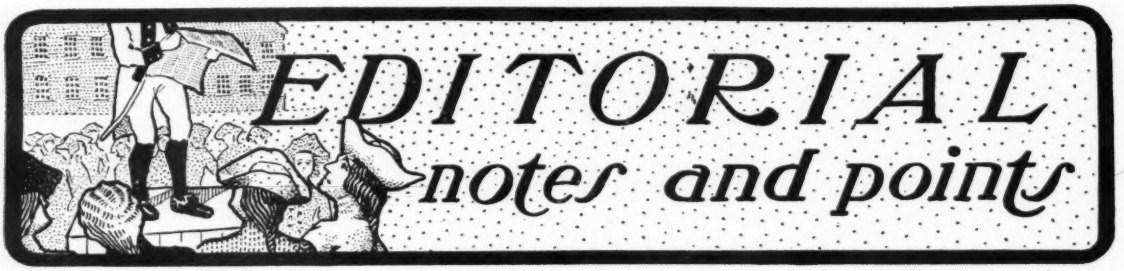
As outlined in Mr. Murphy's speech of welcome, the constancy of Marion's welcome was exemplified in the maintenance of a refreshment room, which, being open at all hours, afforded a place of assembly out of convention hours, and the needs of the inner man. The sideboard was exceptionally well stocked with provisions and presented a very tempting aspect.

The principal items of entertainment were a trip to the Soldiers' and Sailors' Home on Tuesday afternoon and a theater party in the evening. The ride about the city in the handsome interurban cars was especially enjoyable, and the sights and scenes at the Home proved a great source of interest to the visitors. A slight idea of the magnitude of the place can be gained from the fact that the main dining-room has a capacity for seating 1,074 old soldiers at one time. Naturally the kitchen where the requisite amount of food is prepared was another source of wonder to the visitors, these two rooms having seemingly made the most vivid impression on the majority.

The presentation of the "Belle of New York" at the Indiana Theater on Tuesday evening was thoroughly enjoyed by the delegates from seats well up to the front, and the many catchy tunes and laughable situations of the play were roundly applauded by an appreciative audience.

Many of the delegates found the hospitality of Marion so enjoyable that they lingered over Wednesday evening to further enjoy their privileges. It is the regret of your scribe that he was unable to do so, but like the hundred and odd others in attendance he had already absorbed so much of the good feeling of the place that he will not readily forget the good town of Marion nor fail in gratitude to those who contributed to the sum total of enjoyment. It is, therefore, that he inscribes at the close of this chronicle the names of the following master plumbers of Marion as worthy of all honor for their masterful and successful efforts to please and entertain the sixth annual convention of the Indiana State Association of Master Plumbers.

The gentlemen referred to are: D. H. Murphy, R. P. Whisler, M. T. Hegarty, S. D. McLain, Chas. Beshore, John M. McDonnell, J. R. West, and, last but not least, W. F. Gillespie, the genial president.



Is a College Education Worth While to a Business Man?

THE results of an investigation by R. T. Crane, president of Crane Company, Chicago, have recently been compiled by Mr. Crane and issued in the form of a neat little booklet from the Rand-McNally press. Mr. Crane fully defines the subject of his investigation as "The Utility of an Academic Education for Young Men Who Have to Earn Their Own Living and Who Expect to Pursue a Commercial Life."

The necessity for this careful definition becomes at once apparent when we turn to the answers to the letters which Mr. Crane sent out to college presidents, business men and graduates asking for specific information along these lines. In spite of the fact that the investigator further defined the words "academic education" as referring to the ordinary classical courses in high school and college, a considerable number of the answers confounded this with technical and professional education, regarding the utility of which there can hardly be any doubt.

Still a larger number ignored the fact that Mr. Crane asked only for information regarding the utility of higher education in advancing the commercial success of the graduate, and devoted much space to sermonizing on the benefits of education in broadening a man's horizon, increasing his capacity for happiness, tending to make him a more intelligent citizen, etc.

Much of what is said along these lines is well worth considering but it is hardly pertinent to the subject, which has to do only with the success in life which can be measured in dollars and cents. It is therefore hardly to be wondered at if the investigator brushes all this aside with some little show of impatience. The friends of education may be disposed to quarrel with this treatment, but their arguments would really have been stronger had they confined themselves to answering the questions asked.

Regarding the value of a college education in the things which can not be measured by the almighty dollar it is doubtful if Mr. Crane himself would seriously raise a question. It is significant that even those few graduates who admit commercial defeat agree with their more successful brothers in saying that if they had their life to live over again they would take the college training. In other words they are satisfied with the pleasure which their education gives them even though they admit that their measure of worldly success might have been greater had they started in business at an earlier age.

As mentioned above Mr. Crane sent out letters of inquiry to college presidents, business men and college graduates. The letters to the first class mentioned were sent to the heads of nineteen of the leading colleges and universities in the country. Six of these nineteen presidents committed the offense, unpardonable in the eyes of a business man, of neglecting to acknowledge receipt of a business letter.

The investigator's letters to the college presidents asked for information as to whether they had ever compiled evidence as to the advantage of academic education for young men about to enter business; what success college graduates had met with in business life; whether employers were in the habit of asking from the heads of colleges information regarding students about to graduate with a view to selecting their help from among such students, and what is the estimated cost of giving a young man a college education.

None of the college presidents who answered had attempted anything like a systematic investigation of the success met with by graduates of their colleges who had afterward entered business life, but nearly all were of opinion that a college education is a decided benefit to a man even in the commercial arena, cultivating in him the habit of accuracy, the habit of methodically investigating all doubtful points, giving him an ability to make quick decisions, and generally brightening his wits and accustoming him to adapt himself to new and strange conditions, etc.

President Wheeler, of the University of California, and President Hall, of Clarke University, admit frankly that in their opinion the presumption is against the utility of an academic course for business men. The rest of the college presidents excuse themselves from giving more specific information on the ground that while there is no doubt as to the financial success of perhaps the majority of their graduates, the facts are not readily capable of tabulation.

Letters were sent to 1,593 college graduates who have been graduated from the leading colleges during the last six or eight years. These letters asked, for the purpose of investigation, the personal experience of the graduate as to whether his college education had been a help or a hindrance to him in business life, and whether, in his opinion, a young man who was starting out on a business career without the influence of either family or friends—in other words, without what is commonly called a "pull"—would do well to take a college course as a preliminary training. It was sought to get the experience of only such men as had themselves met these conditions, and thus a large majority of those who answered were disqualified.

Only 555 answers were received and of these 490 were from students who have either taken up a professional or technical line of work or who state that they do not come within the scope of the investigation. This leaves only sixty-five letters from the class Mr. Crane desired to reach. Of this number, fourteen do not answer the question as to present income, twenty say that they are in business for themselves, and the remaining thirty one seem nearly all to be doing very well on this score. To the question as to what effect they think their college education has had on their business success, twenty-seven believe that it has helped them, thirteen believe that their present position is about the same as if they had not taken the college course, and fourteen believe that it would have been inferior.

In summing up the results of his correspondence with college students, Mr. Crane takes the position that, as the spirit of loyalty is manifested so strongly by the letters received (and indeed the desire to rush to the defense of college tradition seems to be the only reason that some of the college graduates had for writing), it is a safe inference that the large number who refrained from answering have been unsuccessful in business and feared that an acknowledgment of this fact would be used to the disadvantage of colleges. Undoubtedly this would prove a strong motive in the case of those who had been unsuccessful, but it is to be feared that Mr. Crane is hardly fair to the whole number of those not answering in classing them as failures. If we follow the law of average which held in the case of those who answered, we would probably find that a very large majority of them are in professional life, and that of the minority who entered business a portion are in business for themselves and of those still on salary a goodly percentage are doing well. However this may be, it is to be regretted that a larger number of graduates did not reply to Mr. Crane's letter, so that his investigation might have been more truly representative of this class of men. The letters sent to one hundred representative business men asked for their experience with college graduates in their employ, and their opinion as to whether a young man having only $5,000 (the estimated cost of a college education) should spend it for this purpose in preference to keeping his money and entering upon a business life. Another question was as to the estimated worth to an employer, on the basis of a twenty-year contract, of two young men of equal intelligence, the one having a business training and the other a college education.

The replies of the business men are worthy of being reproduced in full, but the limitations of this review will not even permit extended quotations. Most of the correspondents admit at the outset that they have a very small percentage of college men in their employ—five per cent. being the highest given, and therefore they answer more from theory than from experience.

The following quotation from the reply of E. S. Conway, secretary of the W. W. Kimball Company, Chicago, is perhaps representative of the general tone of nearly all the answers:

"If all young men who desire a college education, and are able to attain it, returning from college at twenty-two or twenty-three, with their feet flat on the ground, and a willingness on their part to begin at the bottom, working in the primary school of business with boys of fifteen or sixteen years of age, and never refer to the fact

that they are college bred, but are content with the consciousness that they have a good foundation and apply their energies to their business undertaking, such college graduates will stand a good chance before middle life of passing the boy who began his business life five or six years earlier, but without the college education."

While few of the business men answer specifically Mr. Crane's question as to the supposed case of the young man having only five thousand dollars to invest in either an education or in business, they are almost unanimous in the opinion that the best education a man can get is none too good for even a business man, always provided that he is not the kind of a man to whom a little learning is a dangerous thing.

Mr. Crane, in his deductions, points out an obvious inconsistency between the theory and the practice of his business friends. They advocate college education for business men, and yet by their own confession employ only an inconsiderable number of them upon their graduation. Mr. Crane accounts for this inconsistency on the ground that some who advocate college education have been of their present opinion only a very short while, while others are obviously stretching their consciences a trifle in order to speak a good word for college people. This he characterizes as mistaken kindness, believing that they would have been infinitely more kind to the colleges, and especially to young men contemplating a college course, had they frankly admitted that in considering an applicant for a position they are more interested in whether he understands their business and can promote it than in his knowledge of Greek and Latin or the "mental drill or the well-rounded character" which he may have acquired through a course in college.

In summing up the results of his investigation Mr. Crane feels compelled to declare that, in the opinion of the investigator, college education for business men has been weighed in the balance and found wanting.

In conclusion, he gives the young man on the threshold of life a short talk on the importance of a right start, which, of course, is to be from the bottom up, not from the top down. He illustrates his conclusions with incidents from his own experience and observation and from the lives of other business men who have been more than ordinarily successful. Naturally the comparisons he draws are not favorable to the college-bred man.

The whole subject is one of great interest to anyone who has at heart the welfare of the coming generations, and whichever side of the question one may favor he must admit that a great service has been rendered by Mr. Crane in his efforts to get at the truth of the matter. It may be the shaking up which the college presidents have received at his hands will cause them to make an effort to make their courses of study more practical and of greater value to the man who does not expect to follow one of the professions; young men pausing in indecision may draw from Mr. Crane's investigation the data which will enable them to choose wisely which course they will take; while the business men who have thus had their attention called to the matter will doubtless give it further thought and endeavor to reconcile their theory and their practice.

Never pay any attention to croakers—it is the people with sunny temperaments who produce things and make life worth living.—*The Advertiser.*

A real timid man should never attempt advertising as a means of gaining wealth, for he will most likely quit before the time is ripe for reaping any reward.—*Advertising Success.*

The City of Mexico from a Sanitary Standpoint.

By Major E. P. Bancroft.

THERE is no other city on the globe so peculiarly situated topographically as the City of Mexico. While situated at the bottom of a valley nearly circular, surrounded by a continuous chain of high mountains, it is still nearly 7,500 feet above sea level.

The entire valley, with an average diameter of seventy miles, was once without doubt a vast fresh water lake; indeed a portion of it is covered with water to the present day.

The original Aztec city, the predecessor of the present city which was founded by Cortez, was, if we may believe the author of "The Fair God," located on an island near the middle of this great lake.

It is one of the wonders of the world that a city should have been maintained with varying conditions of prosperity and adversity on such a spot for more (how much more no man knows) than seven hundred years, attaining at last to a population of half a million souls.

That the Aztecs should have selected this site originally on account of its easy defense from their marauding enemies may be readily conceived; but that Cortez, who is credited by all his historians with great sagacity and foresight, should have rebuilt on the site of the devastated city, the seat of what he fondly believed would be a vast and powerful empire, passes all comprehension.

The reader must bear in mind that this great valley, which with the water shed surrounding it contains more than six thousand square miles, possessed until very recently absolutely no drainage whatever.

Imagine this entire valley, including by far the largest part of the city, flooded almost every year by the torrential rains of this region to the depth of several feet, with no possible outlet except by evaporation.

Even in the dryest season the soil is supersaturated with water within a foot or two of the surface.

Shallow, narrow canals, or rather ditches, barely wide enough for the passage of the little flat-bottomed boats of the trucksters to pass, receive the surface drainage in the dry seasons, and also serve as a market place for the vending of the daily supply of vegetables.

With such unsanitary conditions, the wonder is not that it has been the most unhealthy city in the world, but that human beings could live there at all.

That the municipal and National governments have been aware of the pressing necessity of improvement in the condition of the city is proved by the fact that within the last fifty years at least four contracts have been let for the drainage of the city and valley, all of which were failures, owing to lack of money or the unsettled political condition of the country.

At last, about fifteen years ago, a company of capitalists were found who were willing to undertake the vast enterprise and trust the authorities to pay them as their means were available.

This magnificent work, which ranks among the foremost triumphs of engineering in the world, was completed little more than a year ago. For the purposes of this article it is not necessary to describe this great canal and wonderful tunnel; suffice it to say that it accomplishes perfectly the object for which it was intended, to wit, to drain the surplus water from the whole valley and city to a depth which will allow a complete system of sewers for the whole city, which are now being constructed with a promise of completion during the present fiscal year. In addition to the splendid system of sewers about ten million dollars are being expended this year for other improvements of utility and beauty.

The Mexican people are quick to imitate whatever they find worthy of imitation, and with the completion of their sewerage system the enlightened and progressive local and national governments will undoubtedly compel the adoption of modern plumbing and other sanitary methods. Of these facts the readers of DOMESTIC ENGINEERING will of course take notice and govern themselves accordingly.

The foreign population of the city at the present time is about 20,000, which, added to at least twice that number of wealthy and progressive Mexicans, forms a clientage well worth cultivation by our enterprising manufacturers and jobbers.

The City of Mexico, although well within the tropics, has anything but a typical tropical climate by reason of its high altitude, which counteracts its low latitude. Meteorological observations have been recorded for the last twenty-five years which show a mean annual temperature of 59.79 degrees F., while the average for May, the hottest month, is 64.58 degrees, and for December, the coldest month, it is 53.60 degrees. With the sanitary and other improvements soon to be completed, this city will become one of the most delightful residences in the world.

THE PERFECTION OF VENTILATION.

Dr. A. Wynter Blyth, barrister-at-law and medical officer of health for Marylebone, had a startling proposition to make in his capacity of new president of the Incorporated Society of Medical Officers of Health, who held their annual gathering at the Hotel Cecil. In his presidential address he discussed the subject of "Ventilation" in all its bearings, says the London *Chronicle*. To improper ventilation he attributed the low state of public health, which conduced to the spread of tuberculosis and other maladies. After dilating upon the atmosphere and excellent ventilation of the tube railway, he said it was within the possibilities of modern science to make the deepest mine not only habitable, but agreeable and healthy. It might be hereafter a contribution to the solution of the housing question to build downward in the depths instead of upward on the mountain. One could imagine a Jules Verne cavernous city, where the sky was the ever-white, changeless chalk, where no rain fell, where no frost penetrated, where the light never failed, and where dry, warm, filtered, purified, ozonized air bathed the lungs and fanned the cheeks of the denizens in the constant white glare of a never-dying summer's day. In tenement-houses and workplaces it was better to deal with each individual room and give them their own ventilating system. With regard to the ordinary tenement-house it was doubtless at the present time hopeless to suggest any mechanical appliance. They must seek the great factor in the propagation of tubercle in the constant breathing of bad air added to close contact of the healthy and diseased. If some of the great expert talent now employed in the investigation and discussion of problems relating to sewage and sewage disposal were diverted to the study of ventilation, our factories and workshops would put out more work in a given time, and the mean duration of human life in the country would be appreciably lengthened.

Water Gas Wisdom.

The twenty questions concernig the deadliness of various kinds of illuminating gas, put to the State Board of Health by the Massachusetts House at the request of Mr. McNary, of South Boston, have been answered as follows:

1. What is the most dangerous element of the illuminating gas? A.—Carbonic oxide.

2. What per cent of this element is contained in coal gas? A.—About 7 per cent. What per cent in water gas? A.—About 30 per cent.

3. Is the dangerous nature of the gas increased in proportion to the increase in per cent of this element? A.—Yes.

4. How is death caused by inhalation of water gas? State physiological action. A.—Death is caused by changes in the chemical composition of the blood, by the substitution of poisonous carbonic oxide gas for the oxygen which is normally contained in the blood.

5. How is death caused by inhalation of coal gas? State physiological action. A.—While less in degree, the action is the same as in water gas.

6. Is it more difficult to detect a leaking pipe when water gas is used than when coal gas is used? A.—No.

7. If a person is asphyxiated by illuminating gas, does the danger increase in proportion to the carbonic oxide it contains. A.—Yes.

8. What are the chances of recovery after removal from the source of poisoning of a person asphyxiated by coal gas? Water gas? A.—Other things being equal, the experience in Massachusetts shows that the chances of recovery under exposure to escaping coal gas are many times greater than they are when a similar exposure to escaping water gas.

9. Which is it easier to blow out, the flames from coal or water gas? Why? A.—We do not know.

10. Has there been an increase or decrease in the number of deaths from gas poisoning since the introduction of water gas? A.—A very decided increase.

11. If there has been an increase or decrease, what is the per cent? A.—In the 13 years previous to the introduction of water gas in Massachusetts (1876 to 1888), the number of deaths registered as due to poisoning from illuminating gas was eight. The foregoing deaths were, so far as can be learned, caused by the inhalation of illuminating coal gas. In the 13 years following the introduction (1889 to 1901) the number of deaths registered as due to illuminating gas poisoning was 459.

12. Has the danger from broken or leaking pipes or mains increased or diminished since the introduction of water gas? A.—It has increased.

13. What per cent of carbonic oxide is a safe limit for illuminating gas to contain? A.—Further than has been already said in answer to question 3, that the danger increases with the amount of carbonic oxide present, the board does not know that there is any safe limit.

14. What is the difference in effect of carbonic acid gas and the carbonic oxide of illuminating gas? State physiological effects. A.—Carbonic acid gas produces asphyxia by interference with respiration and with the renewal of the blood by aeration in the lungs; the carbonic oxide gas of illuminating gas effects a chemical poisoning of the blood, taking the place of the oxygen in the blood corpuscles and rendering the blood unfit to support life.

15. State number of deaths from gas poisoning in Boston for the last 10 years. How does this number of deaths from gas poisoning in the city of Boston for the years 1898 and 1899 compare with the deaths of the last two years, 1900 and 1901? A.—The number of deaths recorded as due to poisoning from illuminating gas in Boston in the 10 years, 1892-1901, was as follows: In 1892, 14; in 1893, 23; in 1894, 25; in 1895, 33; in 1896, 42; in 1897, 45; in 1898, 58; in 1899, 51; in 1900, 25; in 1901, 14; total, 320. The deaths from this cause in Boston in 1898 and 1899 were 109; those of 1900 and 1901 were 39.

16. Is there any relation between the deaths occurring in these various years and the increased or decreased use of coal or water gas? A.—Yes.

17. If there is, what, in your opinion, is the relation? A.—That of cause and effect, the greater number of deaths corresponding to the increased use of water gas.

18. Does the continuous absorption of gas in quantities not sufficient to cause asphyxiation tend to the development of disease, such as consumption or heart disease, or may it undermine the system so that these or other diseases may find it easy of attack? A.—In the present state of our knowledge a definite answer to this question is not possible.

19. Is there any difference between the effect of coal gas or water gas in this regard? A.—We do not know.

20. Can coal and water gas be mixed so as to bring the per cent of carbonic oxide down to a safe point? A.—We have not been able to ascertain this fact by experiment.

Wm. J. Bryan Buys One.

The Davis Acetylene Co., of Chicago, have recently sold one of their generators to Wm. Jennings Bryan for his residence in Lincoln, Neb.

A Brilliant Light.

Mayor, Lane & Co., 128-130-132 White street, New York City, are having quite a run on the Aluminum gas tip. This is made of aluminum on a new principle, which produces a brilliant even flame, that is said to have no equal. Combustion-perfect, will not rust, clog, corrode or smoke and is said to consume less gas than any other now on the market. These tips are made in any size and to fit any burner. By writing Mayor, Lane & Company and mentioning Domestic Engineering they will be glad to mail catalogue and price list.

To Supply Fuel Oil Through Water Pipe Mains.

According to reports from New Orleans, John W. Gates is negotiating for the purchase of the entire waterworks system of New Orleans for the purpose of transforming it into a huge system for the conveyance of oil. The waterworks are owned by a private corporation. Residents of New Orleans have not patronized the system to any great extent since the establishment, most of them obtaining the water supply from their "back-yard cisterns." Hence the giving up of the water pipes and plants to the proposed new usage would not work any great hardship on the people. There is doubt, however, as to whether the underwriters and the city council will consent to the use of the water mains and pipes for conveying oil. Mr. Gates' plan is to convert the reservoir of the city of New Orleans water works, which holds 20,000,000 gallons, into a huge tank for the storage of Beaumont oil, furnishing it to every house and factory in the city through the 500 miles of connecting mains. It is claimed that New Orleans could thus be supplied with fuel cheaper than any other city in the world.

Gaslight and Ventilation.

An attempt has been made of late to convince the public that the burning of gas in dwelling rooms is not nearly so deleterious a proceeding as it is usually thought to be. The warmth of the gas flame is extolled, and air that has passed through it is, of course, germ-free. Then a little extra carbonic acid is rather soothing and pleasant, and any excess can be got rid of by opening the window of the apartment an inch or so at the top. All which talk is pestilent nonsense. As if the proper way to prepare air to pass through human lungs was to pass it through a gas-burner. To mix the products of combustion with the air we breathe is, as Dr. Parkes said half a century ago, barbarous. A single burner will devitalize the atmosphere by removing its oxygen and charging it with carbon dioxide as much as four or five persons would do. The position of gas as an illuminant has been enormously improved by the use of the incandescent mantle; the light is purer and the combustion more complete. On one condition it is superior to electric light, the condition, namely, that it shall be burned in a chimney and the products of combustion instantly carried off into the open. Then the flame becomes a ventilator; instead of deteriorating it is constantly improving the quality of the air by renewing it, and the more gas is burned the better for the salubrity of the apartment. Unfortunately not one room in a thousand in which gas is burned is thus treated, and in every other the air is contaminated, and noxious products are breathed until by accident rather than design they find an exit. —*London Telegraph.*

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Banquet of Plumbing and Steam Supply Bowling League.

Wholesalers of New York and vicinity enjoy a sumptuous dinner at the close of the bowling season.

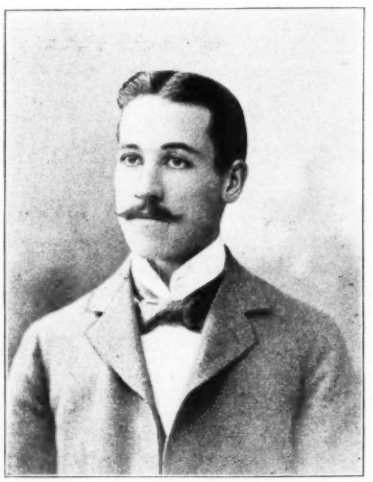
The first annual dinner of the Plumbing and Steam Supply Bowling League, closing the tournament season 1901-1902 was held at the Drug Trade Club rooms, 100 William street, New York City, on the evening of March 22. About 6:30 p. m. the members and guests began to arrive. Soon there were assembled fully 150 in the reception-hall where for over an hour they enjoyed themselves in a business and social chat, while E. E. Haff, president, R. C. Wilson, secretary, C. Y. Beach, vice-president and W. C. Hallett, treasurer, made them all welcome and at home. The board of managers, consisting of H. M. Smith, W. M. Murray, A. Bearenklau, J. S. Dibley and W. T. Gilmore, were not idle but were also there making themselves generally useful in entertaining and assisting the officers with the "glad hand" extended to one and all.

At about 8 o'clock seats in the assembly and dining-hall were by invitation of the president, E. E. Haff soon filled by the members of the different teams, each team keeping together. There were several long rows of tables nicely decorated for the occasion while the officers and invited guests were seated at the head of the two longest rows of tables where all could be seen and heard. As President Haff arose to address them he could see at a glance that most of them were young men, full of business, vigor and enterprise in the plumbing and steam heating supply business as dealers or manufacturers. Representatives of the trade press were also present and they had all come together to enjoy a social dinner and for the fortunate prize-winners to receive their rewards for good work in play during the tournament. The season's intercourse had cemented them together in harmony, good fellowship and a better business acquaintanceship. All of this was reflected by the pleased expression on the many faces present. The president after all there had been regaled by a hearty dinner, rose and said: "Gentlemen of the Plumbing and Steam Supply Bowling League, we are here to-night to celebrate the closing of the tournament. During these games all of you have demonstrated fully that we have amongst us some 'cracker jack' teams that can win a first prize beyond a doubt and whom we will not be ashamed to enter in contest against the best that may wish to try us. [Applause.]

"Yes, gentlemen, we have members who are plumb full of steam supply energy who can send the balls flying down the alley knocking the pins every time 'all to the good,'—and I can furnish the 'spares' if necessary. [Applause.] I now take great pleasure in calling upon our well known friend, John A. Campbell, of the Trenton Potteries Company, of Trenton, N. J., to present the first prize to the Behrer & Co. team." Mr. Campbell made a witty speech which will be long remembered by those who were fortunate enough to be there to hear him.

Among other things Mr. Campbell said, "I am surprised that I am called upon to present this first prize and I have just concluded it must be because I am from the Trenton Potteries Company, over in New Jersey, where the mosquitoes and trusts come from, and because we are known as 'bowl-ers' by business. Although I am here this evening on a 'Haff' invitation on the whole I have enjoyed myself very much and now give thanks for the abundance given me. I am like the tramp who when asked why he did not say grace before the meal was eaten, said, 'Chauncey Depew and me never say grace until after we've ett.' [Applause.] In the olden times men spent most of their money 'bowling on the green' and often had not enough left to buy their supper. Another man in order to save enough swallowed a $5.00 gold piece, and to get it again they applied a pump, but only succeeded in getting him to cough up $2.75. A man in Leadville claims that 'money is the root of all evil' and says he does not care for it, but the very last that was seen of him he was digging for more roots." [Applause.] Mr. Campbell then presented the prize, saying, "May you during life make a good many 'ten strikes.' On behalf of the league I take great pleasure in presenting this $25.00 in gold,—the first prize." Martin Behrer on behalf of the team accepted the prize in a very neat little speech.

The president then called upon Mr. Waldenberg to present the second prize to the Crane Company Team. He said, "Some people say there is no friendship in business but I do not agree with them for to-night you can see the 'lion and the lamb' sitting down together and feasting to their heart's content. For this and for the success of the tournament allow me, Mr. President, to congratulate you and Secretary Wilson. I hope that you will continue these tournaments and I hope also to see a cup offered to be contested for in our next tournament and the three time winner to keep it until a better team can justly claim it from them. I take great pleasure in presenting the $20.00 gold prize to Mr. Van Steenberg, the representative of the Crane company team." The latter gentleman responded in a few appropriate remarks on behalf of his team.



E. H. HAFF.

Frank Chew, representative of the Metal Worker, was then called upon to present the third prize to the John Simmons Company team. He said: "Although this tournament seemed to be done by 'Haff' we only fell behind in securing a higher prize by the loss of two pins. As money is hard to get and 'tis said that a bird in the hand is worth two in the bush one feels like hanging on to a good thing while he has it in hand. For all that, it gives me much pleasure to present this $15.00 in gold to the representative of the John Simmons Company team."

The above firm's representative in accepting the money made a very careful examination of it as if it might not all be there, saying that a few pieces might have been 'Chew-ed' off and that all that glitters might not be gold.

John A. Murray was then called upon to present the fourth prize, and said, "It is a pleasure for me, gentlemen, to present this prize to the Ronalds & Johnson team, for I know they have done the best they could and I trust in the next trial they may be at the head of the prize winners, as nothing, you know succeeds like success, and this team has a good start to enter upon the next tournament. As for myself I might say I am glad I am here to-night as a plumbers' supply man. As I look over those present here to-night I see that they are young men who have set a good standard of good fellowship and show a spirit that I hope you will carry into business. I hope that you will continue this spirit and do the very best you can to win the better prizes. I now take pleasure in stating that this team not only won the fourth team prize of $12.00, but received the high team score prize as well, consisting of $5.00 which I take pleasure in presenting their representative."

Martin Behrer, being called upon to present the fifth prize to the Du Bois & Company team said that he had prepared a nice little speech for the occasion, but forgot to bring it along. He thought the good we are doing in these friendly gatherings will bring better results so that better times will find us in a position to help this good cause along. If more of the heads of houses would appear in the tournament it would be a good idea and encouraging to the young men of the trade. He said further that the Du Bois Company team appeared one evening at the bowling alley with small lead traps upon them as a souvenir badge and no doubt they thought this mascot of theirs might help them en-trap us, but we gave them a 'flush' and rushed on for the first prize. Still their mascot served them very well in securing the fifth prize, and it gives me pleasure to present $10.00 in gold to them. George M. Fawcett on behalf of this team in accepting the prize said, "We are very much pleased to accept this prize and hope in the next trial to be able to make a much better showing. We have with us here to-night 18 bowlers and everyone of them a first class bowler."

Just then some one called out "Why don't you get an alley of your own." [Applause.]

Frank P. Richardson was then called upon to present the sixth prize, which was won by the Dimock & Fink Company team and said, "Were I as full of beauty and eloquence as the president, Mr. Haff, or John A. Murray, I might feel at home now in this effort of speech, yet while John Murray may be tearing down a Presbyterian church and be paid for doing it, I am not paid for this job here to-night, or in trim to suit the occasion, like the beggar in England, who had a sign on him saying that he was an unforunate soldier of the Boer war. He certainly looked it, having lost both arms, one eye, one ear and one leg. Soon an Irishman came along and on reading the beggar's sign gave him a penny, and while turning to walk away was asked why he gave the man money and replied that the beggar was the only British soldier he had ever seen trimmed to suit him. While not trimmed to suit, still I am pleased and feel flattered at being called upon to present this prize of $7.50 to the Dimock & Fink Company team."

Clifford Driggs, of the H. P. Read Lead Works, responded to the call from the president to present the seventh prize to the C. S. Locke & Smith Company team. "It seems to me," he said, "you may be think-

ing by calling upon me at this time that the oldest and best wine is being held until the last of the feast, yet with the many 'miss-spares' made I see we are all here to-night in harmony and as 'tis said, 'Come seven, come eleven,' this team come seven. In handing over the prize of $5.00, he cautioned them not to spend it in places raided by vice crusaders. Mr. Smith, on behalf of his team accepted the prize with some well timed remarks and gave due credit to the managers for their success in bringing this tournament to perfection.

The prizes for individual averages were then distributed as follows: First prize, J. S. Dibley, $5.00, followed by a speech by Mr. Walters; second prize, R. C. Wilson, of $3.00, with remarks by F. W. Blauvelt, who also quoted some very clever verse appropriate to the occasion.

YOU COULDN'T HARDLY NOTICE IT AT ALL.

When Rolly rolled his average score,
If he had made just one spare more,
  He'd won first prize and made a bigger haul,
But although the game was fair,
He just missed it by a hair,
  And you couldn't hardly notice it at all.

As captain of the Salesmen's team,
With honest pride his eye did gleam
  Upon his bowlers, who were doomed to fall,
And when the Murray team they met,
Although they went for them, you bet,
  You couldn't hardly notice it at all.

Then they rolled Du Bois & Co.,
And found their team was not so slow,
  But still they thought they'd drive them to the wall,
And while they played a good, stiff game,
I have to tell you, all the same,
  That you couldn't hardly notice it at all.

So to drown their woes up to the bar they flew,
And ordered several drinks from our good friend Cadieu,
  I'm told they all took a Wilson High Ball;
And when they'd drank it down
You'd thought their heads would swim around,
  But you couldn't hardly notice it at all.

Now with the Salesmen's team we all do sympathize,
Because they had hard luck and didn't win a prize
  To which with pride they might attention call;
But when they only sent three men,
Of course, their score was queered for them,
  And you couldn't hardly notice it at all.

The third of $2.00 was won by A. E. Good, of the Crane Company team. Mr. Good was unforunately not present, being detained by sickness at home. Thomas A. Cushing responded for him. The highest individual score prize was won by M. Stein. The least number of breaks prize went to C. W. Grimshaw,—a pair of pearl and gold mounted opera glasses donated by W. S. Emery, and the greatest number of 'spares' prizes, $5.00 in gold, was won by President E. E. Haff, and presented to him by Thomas L. Delaney. of Kings, who said, "The hour now seems very late for speech-making and although I see so many young faces there are still a number of the old ones here to-night, who used to get to work at seven in the morning and quit at seven in the evening in those olden times which have now passed by. The large number here to-night is certainly encouraging and it will not be long before many of these young men here will be occupying the masters' place. It gives me great pleasure to give this token to a young man here who is on the top of the ladder in his house, who when he started to work got out at 6 o'clock in the morning and often did not reach home until 12 o'clock midnight. I have known him for many years, and he is fully entitled to all the honor we can bestow upon him. He is the leading 'spare' bowler and the president of this tournament, which he was very largely instrumental in organizing and carrying through to success." Mr. Haff replied that he thanked them all for their kindness, good will, and untiring energy in assisting him in making this their first tournament a success. [Applause.] A. R. Pearson, whose average score in the last half of games showeu the greatest increase over the first half of games bowled, was awarded a pair of gold diamond sleeve buttons. The last, but not the least prize, was that given by Mr. Conran to William Reines for making the smallest score; it was a leather medal. Mr. Reines, having made but one strike, and not being a hog, knew when he had had enough and quit. He was requested to wear the medal and cherish it as any soldier might the medals won on the field of battle. Just at this point a special prize, consiting of a very fine, elaborately decorated stein, about a foot and a half high, was presented to Mr. Glauber, who had won the same at a little game on the side.

Jno. K. Allen, president of DOMESTIC ENGINEERING, made the presentation speech awarding to Mr. Steen the prize given for the highest individual score. Mr. Steen's total was 230.

A vote of thanks was then given to John M. Campbell, who furnished the score-books, and to Mr. Cadieu, proprietor of the Monarch bowling alleys, for courtesies extended by him. A vote of thanks was also extended the press for their kindness in publishing the games, and to the officers of the Plumbing and Steam Supply League for their efficiency. Interspersed between the speeches witty remarks were made and songs heard that were very much enjoyed by all present.

The following officers were elected for the ensuing year:

President, Martin Behrer; vice-president, C. V. Driggs; secretary, W. G. McCormick; treasurer, Fred Lowe.

Board of Managers—W. S. Gibb, A. E. Good, J. R. Igelstrom, A. E. Beith and W. B. Ogg.

Captain—W. S. Emery.

The menu gotten up for the occasion was most appropriately arranged, as will be readily seen.

FIRST ANNUAL DINNER OF THE PLUMBING AND STEAM SUPPLY BOWLING LEAGUE.
Closing the Season 1901-1902.
Drug Trade Club, March the 22d.

MENU.

First Frame.
"Splits All Along the Line."
Blue Points on half shell.
Second Frame.
"Having the Soup Poured Into Us."
Cream of Chicken a la Reine.
"Good Eye."
Olives. Celery.
Third Frame.
"All Right."
Filet of Striped Bass, Marguery.
Potatoes Bermuda, Parisienne.
Fourth Frame.
"Take Your Time."
Tenderloin of Beef, pique, with Mushrooms.
French Peas.
Fifth Frame.
"Easy Spare."
Sorbet—Frozen Scotch.
Cigarettes.
Sixth Frame.
"Look Out for a Foul."
Roast Philadelphia Chicken, Stuffed, with Cresses.
Cranberry Sauce. Celery Mayonnaise.
Seventh Frame.
"Triple Headers."
Neapolitan Ice Cream.

R. C. WILSON.

Assorted Cakes. Fancy Macaroons.
Eighth Frame.
"A Strong Finish."
Roquefort and Brie Cheese.
Ninth Frame.
"All Down."
Coffee.
Tenth Frame.
Cigars.
"Set 'Em Up On The Other Alley."

Among those who sat down to the above feast may be mentioned John E. Brinkman, Wm. H. McKinnery, Fred A. Lowe, W. Palmer, Morgan E. Ebbets, James B. Bradford, F. C. Landfear, W. B. Ogg, J. H. Walters, Jr., J. Donohue, H. Taylor, W. Deacost, H. W. Zetcher, Westly Petraous, W. O. Hyenp, H. W. Long, C. Y. Beach, J. S. Dibley, John F. Hirsch, Albert P. Thill, John J. Savage, John J. Walsh, Clifford D. Driggs, Howard James, Percy Manning, Chas. H. Adams, Mathew Arthur, Harry J. Hanney, John Mack, G. W. Tilton, Wm. M. Murray, Wm. B. Carter, Chas. McTierney, Wm. Van Steenberg, Enoch Harris, David McCuslin, James F. Mahrer, H. B. Olmstead, A. L. Phipps, Sam A. Glauber, Charles S. Hirschfeld, W. B. Maddock, A. M. Maddock, Thos. H. Hutchinson, Clifford T. Schlemmer, W. S. Emery, O. W. Jackson, W. J. Wright, W. L. Van Wagner, Richard Ploettner, C. Emerson Hartsorne, John David Newman, Thomas A. Morton, Jos. P. Kelly, Harry Lydecker, A. E. Chatwin, Ph. Wiegandy, Wm. A. Presby, Harry Joseph Winkler, Richard Clay, Henry Stein, E. Ernest Benas, Wm. D. Rothermell, Alvah Tompkins, Wm. Stuart, C. A. Blanchard, W. H. Blaschard, Wm. P. Conran, Edw. P. Erieson, R. J. Pearson, Wm. A. Fleming, Charles Harrison, Wm. R. Spelman, Jr., Jas. S. McGroarty, V. P. Ketcham, G. E. Myers, F. W. Blauvelt, Geo. M. Fawcett, Arnold Behrer, Jr., George H. Billo, Martin Behrer, Frank K. Chew, Wm. E. Lawton, Albert J. Pearson, Harry M. Smith, T. A. Hill, F. S. Grol, C. O. Ketcham, W. H. Kerr, R. A. H. Clenahan, John P. Coleman, S. Ketcham, B. S. Kelly, F. A. E. Renner, F. D. Blamelo, Chas. H. Frear, Robert C. Smith, Arnold N. Kerm, Clarence Behrer, John A. Campbell, John A. Murray, J. F. Couran, G. Van Steenbergh, B. L. McCleary, C. W. Grimshaw, S. C. Marx, F. G. Harris, C. Benard, Jr., F. J. Cavanaugh, G. W. Walsh, W. M. Frothingham, W. T. Conran, W. G. McCormick, R. Walter Steverman, A. B. Beith, Geo. P. Hamilton, W. R. Burt, Elmer Crawford, Jno. K. Allen, Gilbert McDuff, Wil C. Ellsler, C. J. Weber, E. Flosheim, Jno. S. Wellings, H. Kent, F. Hogenauer, G. E. Robinson, Thomas M. DeLaney, Frank P. Richardson, C. Y. Beach, R. C. Wilson, E. E. Haff, W. C. Hallett, W. S. Gilmour, J. S. Dibley, Harry L. Olmstead and many others.

THOMAS CONLIN GETS CONTRACT.

Thomas Conlin, Thirty-ninth street and Cottage Grove avenue, has secured the contract for the Wilson building on Fifth avenue. W. W. Clay is the architect.

PROCEEDINGS OF KANSAS M. P.'S ASSOCIATION.

We are indebted to A. P. Elder, of Ottawa, Kan., secretary of the Kansas Master Plumbers' Association, for the official record of the proceedings of the association at its semi-annual meeting at Topeka, January 20 last. It will be remembered that Mr. Elder gave our readers at the time a very readable account of the doings of the convention and the official proceedings, compiled by the same skillful hand, are quite as readable.

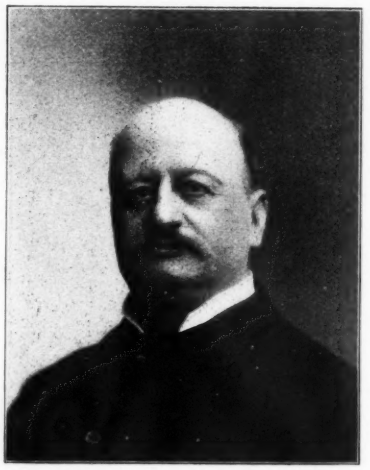
DOINGS OF CALIFORNIA MASTER PLUMBERS.

From the office of J. L. E. Firmin, state secretary of the Master Plumbers' Association in California, we receive a copy of the proceedings of the fourth annual conventions of the northern and southern jurisdictions of California on May 7, 8, 9 and 10, 1901. The proceedings are brought up to date by the insertion of an appendix containing the Cleveland Resolutions, and pungent paragraphs at the bottom of each page encourage members to loyalty to the aims and purposes of the association. The book is well executed and a handy reference book for the use of state officers and members.

Annual Convention of the New York State Association of Master Plumbers.

IT was in the month of March, days eleven and twelve, so the official souvenir expressed it, and for a wonder the sun was shining, on the opening morning at least. And at that time, and on those days the New York State Association of Master Plumbers, by its delegates gathered from the four corners of the commonwealth, met for the fourteenth time in annual convention.

The place chosen this year was the handsome and thriving city of Elmira, on the banks of the swift flowing Chemung, famous as the home of Senator David B. Hill, the State Reformatory, and numerous other people and things of which limited space forbids mention.



CHARLES B. HUCK of Buffalo.
President New York State Association of Master Plumbers.

The annual convention of the New York M. P.'s is an event of events, for is not this the Empire State of the Union, held down on the map by the metropolis of our nation at one end, and by the Pan-American Queen City of the Lakes at the other, to say nothing of the ballast furnished by the growing and opulent cities between? And is not her state association the largest, strongest and most closely organized, with a membership the most prosperous, most eloquent and the "scrappiest" in the land?

A majority of the delegates arrived on the previous afternoon, including the large representation from Manhattan, Brooklyn, and the other boroughs of Greater New York, and the imposing delegation from Buffalo, 38 strong, each party coming in its own private car.

Every train brought reinforcements from various other sections of the state. The Rathbun Hotel had been selected as headquarters, with the Hotel Langwell in reserve for the overflow, but both were filled, and there was an overflow still.

Promptly at 10 a. m. State President Charles B. Huck, of Buffalo, marshalled the hosts in line in front of the Rathbun, and the party proceeded to the assembly chamber of Elmira's handsome city hall, a place admirably adapted for convention purposes.

The delegations took their places and in a few minutes President Huck rapped for order and stated that pending the arrival of the mayor, who was to address the convention, he would announce the various committees. He first appointed Frederick Le Valley, of Le Valley, McLeod & Co., Elmira, sergeant-at-arms. Following are the committees named:

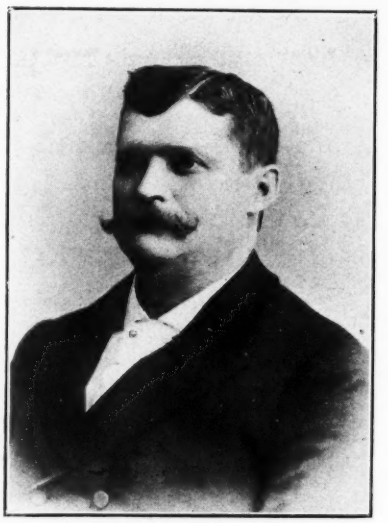
Credentials—W. G. Reid, of Rochester; J. S. Stygall, of Buffalo; Horace F. Wescott, of Albany; John Renehan, of New York; John Holihan, of Auburn.

Resolutions—William J. McDermott, of New York; Edward MacDonald, of Brooklyn; Charles Breen, of Utica; William F. Gooley, of Syracuse; William F. Quinn, of Troy.

Auditing—A. A. Dumond, of Rochester; Charles A. Campbell, of Watertown; Frank F. Schimpf, of Albany.

In the meantime Daniel Sheehan, Elmira's new mayor, who had taken his oath of office only the day before, reached the hall and was escorted to the platform. At 10:50 President Huck again wielded the gavel, formally called the convention to order, and introduced Robert H. Walker, chairman of the local committee of reception and entertainment. He referred to Mr. Walker as a man who had won the esteem and good fellowship of every master plumber and guest present by his geniality and by the manner in which he had looked after the welfare of the visitors. Mr. Walker was greeted with cheers as he stepped forward. He said:

"On behalf of the Elmira branch of the Master Plumbers' Association I extend to you a cordial and hearty welcome. One year ago at your convention in Syracuse you said that this year you would come up here and 'wake up those sleepy plumbers at Elmira.'



JOHN WALKER of Elmira,
President of Elmira Master Plumbers' Association.

Gentlemen, we are awake. We are now a member of your association and also of the national association, and, what is more, we are going to stay members of both. (Loud cheering.) A while ago we were members and drifted away, but discovered our mistake and are back to stay. We are a small body, but are very glad to have you with us."

Mr. Walker in a few well chosen words then introduced Mayor Sheehan, who was applauded as he advanced to the front of

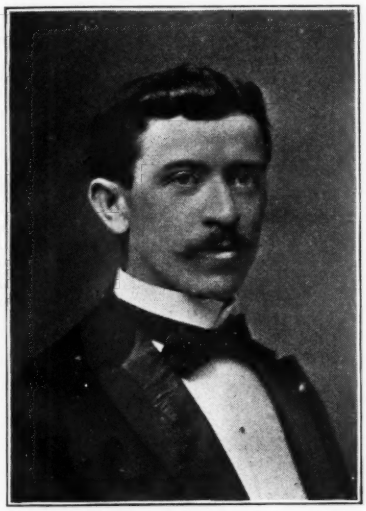
the rostrum. He welcomed Elmira's guests in the following speech:

"Gentlemen of the Convention:

"In the name and on behalf of the citizens of Elmira I extend to you most hearty greeting and welcome you to our beautiful and thriving city. Enjoy its freedom during the period of your stay among us; partake of its generous hospitality; meet many old friends, and form new and lasting friendships.

"The various departments of our city are ever ready for your inspection, and those in charge will appreciate a visit from you while here. Personally I feel honored in having the opportunity and pleasure of being present to welcome such a fine body of the Empire State's substantial and progressive business men as I see before me.

"Your body is composed of successful business men organized for the purpose of promoting the best interests of your trade,



JOHN E. DUGAN of Albany,
National Vice-President for New York State.

which is a most laudable one because the health of a municipality depends largely upon proper and scientific plumbing, and the comfort of the home, public buildings and business places is greatly enhanced by a correct system of plumbing, heating and ventilation.

"I hope that your proceedings may add to the strength and wellbeing of your association and that your deliberations may be productive of much good.

"The local members of your association stand high in the esteem of Elmirans. We count them as among our very best and most progressive citizens. They are first in every effort to promote the welfare of Elmira and its best interests and their generous hospitality is well known to most of you. We bespeak for you at their hands a most cordial and enjoyable visit. Again I welcome you most cordially to our city."

The Mayor's address was greeted with warm applause. President Huck responded in his usual happy and facetious style, saying in part:

"In the name of the master plumbers of the state of New York, I thank you for your hearty welcome, and commend you to the prayers of these, the noblest people of God's creation."

Mr. Huck then introduced James Walker as "the father of all the Walkers, and the father of plumbing in Elmira." Mr. Walker said:

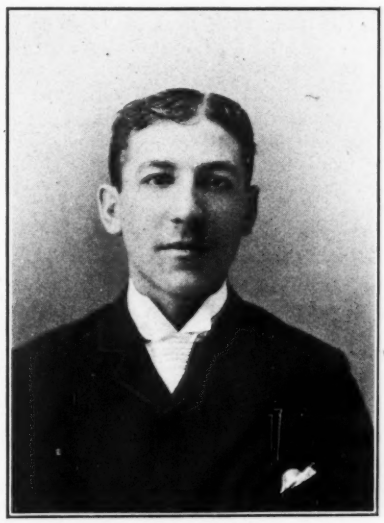
"No Walker was ever a great talker, and I uphold the reputation of the family in that respect. I am glad you are all here and I will join with you in your business and amusement."

At this point President Huck invited to a seat on the platform Samuel L. Malcolm, of New York, ex-president of the National Association, whose rising from his place in the auditorium was greeted with applause. Ex-State President William G. Reid was also applauded as he advanced to the platform. Mr. Reid, as chairman of the credentials committee, pending its final report, read the names of fifteen delegates, as a matter of form, in order to enable the convention to get down to actual business.

The president announced that his annual address would be presented in executive session. He read letters and telegrams of regret from William H. Barnes, of Troy, and Charles G. Hanchett, of Syracuse, who were ill, and P. H. Carney, of Utica, whose brother had just died. All three were members at large of the executive committee.

The convention extended a cordial vote of thanks to Mayor Sheehan, who arose to retire at this juncture, and got three cheers as he reached the door.

Chairman R. H. Walker, on behalf of the Elmira Association, extended an invitation to the visitors to take a trolley car ride in the afternoon and pay a visit to the State Reformatory. On motion of I. J. Brown of New York, seconded by J. A. Rossman of New York, the invitation was accepted. President Huck said: "Let every member who intends to go stand up," and every man in the hall rose to his feet. "That's good," said Mr. Walker. "There will be room for all."



H. J. WELDNER of Elmira,
Vice-President of Elmira Master Plumbers' Association.

The president read a suggestion of résolution that had been handed in, to the effect that locals and individuals coming into the association, before State convention, be required to pay per capita tax for the year past, those joining after convention to pay dues for the full year in which they join. I. J. Brown, president of the Greater New York Association, demurred at this, and Mr. Malcolm of New York moved that the question be referred to the committee on resolutions. Mr. Hurn of Auburn, Mr. Montgomery of New York, Mr. Geiger of Buffalo, as well as Mr. Malcolm and President Huck, took active part in the discussion which followed, Mr. Malcolm's motion being finally carried.

Thomas F. Gaynor of New York spoke earnestly and forcibly on the power of the general contractor over the plumber and other contractors. He deplored the fact that the Ross bill, which provided for separating and holding out the plumbing, heating, etc., from the general contractor, was lost at the last session of the legislature, and stands small chance of being gotten before that body again at this session. He says that when a general contractor wants to hold money that is due the plumber, all he has to do is to find some little flaw in the work. Association members should use their influence with their legislative representatives in favor of the Ross bill. Master plumbers in smaller cities and towns, being better acquainted with their legislators, could probably accomplish more than those in New York, Brooklyn and Buffalo.

Mr. Morris of Troy asserted that in this matter the Troy association had not been

ANDREW H. BROWN of New York City,
Treasurer of New York State Association.

asleep. They have a legislative committee, have worked earnestly with their legislators and done all they could. He felt sure that Troy's state senator was in favor of the Ross bill. [Cries of "Good for Troy."]

John E. Dugan of Albany, chairman of the state committee on legislation, was called to the stage, where, after reading the text of the Ross bill, he described the efforts of his committee to secure its passage. Mr. Ross, its author, had certainly done all he could to get it through. Mr. Dugan gave it as his opinion that the state architect was the man chiefly responsible for the failure of the bill to become a law. He stated that he believed that the influence of the committee had a potent bearing on the killing last winter of the Kelsey bill, which, had it passed, would have made clerks of examining boards of plumbers, in cities of the second and third class, the appointees of the common councils of those cities, which would tend to bring said boards under the influence of partisan politics. The committee, he said, had also done all it could against the Fowler bill, now before the assembly, which would allow any plumber holding a license in one city or town to do work without question anywhere else in the state except in Greater New York. The mention of this bill brought forth considerable comment from various delegates. Mr. Stygall of Buffalo moved that the report of the committee on legislation be accepted and spread on the minutes, and the motion, after several suggested amendments and substitutes, was passed in its original form.

A recess was taken until 8 P. M., and before going to lunch the entire assembly lined up in front of the city hall while photographs were taken of the group.

Promptly at 2 P. M., the master plumbers, visiting salesmen, members of the press, etc., assembled in a body at the corner of Lake and Water streets, where, under the guidance of the Elmira brethren, they boarded the fine electric cars that were in waiting, and were whirled out to the Elmira State Reformatory, which is about two miles from the center of the city. Here the party was taken in charge by courteous and efficient T. McDonald, the assistant superintendent of the institution, and piloted through the various departments and shown the young inmates at work at almost every conceivable branch of industry. The population of the institution consists of 1,400 young fellows, the majority of whom range in age from sixteen to twenty-three, and the number of different trades taught is thirty-eight. The visitors were most interested in the work of the plumbing class. About forty of the young chaps were engaged in plumbing practice, principally in wiping joints of various kinds and in various positions.

The feature of the afternoon was the drill and dress parade which the boys went through especially for the benefit of the visitors.

The guests were amazed at the precision with which the boys are trained, their evolutions being like clockwork, eliciting thunders of applause from the strenuous and whole-souled M. P.'s. The trip was thoroughly enjoyed by all.

Members were a little slow in assembling for the evening session, the New York delegation, having a meeting of their own on hand at the Hotel Langwell, being quite late. At 8:50 President Huck called for order, and the complete report of the committee on credentials was received and the committee thanked. The report showed that besides the officers and visiting members there were present 112 regular delegates representing thirteen different cities.

Thomas F. Gaynor of New York brought up the matter of the Fowler bill, which had been partly considered in the morning, and almost the whole of the evening session was taken up in discussing this measure. The convention was practically a unit in opposing the bill, but there were a great many opinions as to the best method of immediate opposition, only ten days remaining of the present term of the legislature. Mr. Reid of Rochester, Mr. Morris of Troy, and Mr. Collins of New York made strong, ringing speeches, as did others.

The convention adjourned to meet in executive session at 9:30 A. M.

SECOND DAY.

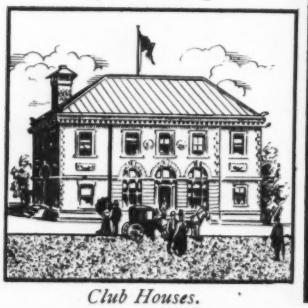
On the morning of the 12th President Huck opened the session shortly after 10 o'clock, and the convention immediately went into executive session for the purpose of hearing and considering the president's address and the anual reports of the secretary, treasurer and other officers. All the members of the association present were more than gratified at the sound, healthy and prosperous condition of the state organization, as shown by these documents. It is conceded on all sides that Mr. Huck has made an ideal president and that his unremitting zeal and systematic and businesslike methods have placed the New York association on a higher plane and a more solid foundation than it has ever before occupied.

The executive session lasted through the forenoon and continued through a considerable portion of the afternoon session.

About 4 o'clock the election of officers was taken up, W. J. McDermott and Frank Reynolds of New York being appointed tellers. Well, as the boys say, "There was nothing to it." For president, no name was considered but that of Charles B. Huck. Mr. Malcolm of New York made the nominating speech, in which he paid a glowing tribute to that gentleman's sterling qualities and efficient service, and the nomination was heartily seconded by William J. McDermott. In a twinkling nominations were closed and the secretary was instructed to cast one ballot for Mr. Huck, who responded by a short, businesslike acknowledgement.

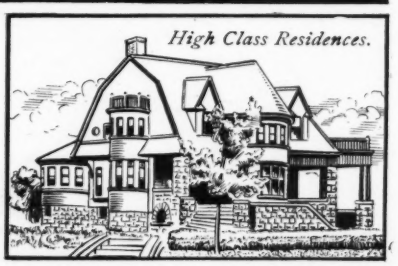
And so it went—Vice-President B. F. Donahoe of New York, Treasurer A. H. Brown of New York, and Secretary H. J. Wood of Buffalo were re-elected with the same unanimity.

Office Buildings.



Club Houses.

Municipal Buildings.



High Class Residences.

Plumbing in high-class buildings of every kind

requires constant care to keep it in a condition corresponding with its elegant surroundings.

The continual rubbing and polishing of nickel-plated brass results, in a short time, in wearing away the nickel-plated surface and exposing the brass underneath.

If the silvery white appearance of the plumbing is to be preserved, the brassy tubing must be renewed from time to time at great expense.

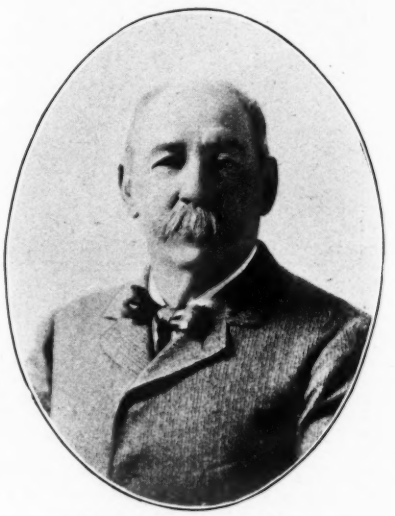
"BENEDICT-NICKEL" Seamless Tubing

is highly non-corrosive. It is white metal clear through; it never shows brassy and it never has to be renewed. The only expense is its first cost.

Many leading architects, plumbers, etc. are specifying and using "Benedict-Nickel" Seamless Tubing for high-class exposed plumbing in Office Buildings, Club Houses, Municipal Buildings, High Class Residences, etc.

Would you like to know more about it? If so, write for our booklet.

BENEDICT & BURNHAM MFG. CO.
FACTORY AND MAIN OFFICE, WATERBURY, CONN.
New York, 253 Broadway. Boston, 172 High St.



SAMUEL MORRIS of Troy,
Member at Large Executive Committee, New York State Association.

The president has the privilege of naming the secretary, but the members of the convention were so anxious to indorse Mr. Wood that they made his title doubly clear by electing him anyhow.

Three "delegates at large," which means "additional members of the state executive committee," were to be chosen, and only three nominations were made, R. H. Walker of Elmira, Charles A. Campbell of Watertown and Samuel Morris of Troy, being unanimously elected and called to the platform amid applause.

Next in order was the selection of three delegates to the next National convention. Three nominations were made: William G. Reid of Rochester, B. Joseph O'Donnell of Syracuse, and S. H. Barratt of Auburn, when it was discovered that the constitution of the National Association provides that each state's delegation must consist of its president and two others, so it became necessary to take a ballot, which resulted

in the election of Messrs. Reid and O'Donnell by the following vote: Reid 72, O'Donnell 49, Barratt 35.

For state vice-president to the National Association, John E. Dugan of Albany, despite his earnest request to be excused, was unanimously re-elected.

President Huck spoke in glowing terms of the manner in which the rejuvenated Elmira Association had cared for the convention and visitors, and Thomas J. Kavany of Buffalo moved a vote of thanks to its members, which was enthusiastically carried. Thanks were also extended to the trade and daily press.

Mr. Malcolm moved a vote of thanks to Thomas F. Gaynor, New York member of the Executive Board of the National Association, for his loyalty to the Empire State in his admirable conduct of national affairs. This was carried with hearty good-will.

WM. G. REID of Rochester,
Delegate to National Convention.

The only remaining business of importance was the selection of the meeting place for the next convention. Mr. Rossman spoke in favor of going to some small city in need of building up in association matters, and suggested Canandaigua, but Mr. Chapelle of Ithaca made such a strong plea for his city, whose association, he said, is in great need of encouragement, and extended such a hearty invitation that Ithaca was chosen unanimously, and thus ended one of the most successful conventions ever held by this state's organization.

In the evening the Elmira Association tendered the visitors a smoker, vaudeville entertainment, and what they positively refused to call a banquet, but which was an elegant spread, nevertheless. Addresses were made by several prominent citizens of Elmira, Mayor Sheehan, W. W. Cole, superintendent of the Elmira Water, Light and Railroad Co., Dr. Frank H. Flood, ex-mayor; Attorney George McCann, Col. James H. Bacon and Col. J. B. Eustace.

Interspersed with the speechmaking were the numbers of the following musical program:

FRED VICE,
ACROBATIC TRAM.
MISS MARIE GIRARD,
VOCALIST.
MISS LIZZIE BOOTH,
SONG, DANCE AND ACROBAT.
MISS LULU THEIS,
COON SONGS AND WHISTLING.
(Assisted by Little George Williams.)
FLOYD SISTERS,
IN SONGS AND DANCES.
HANSON AND DREW,
COMEDY SKETCH ARTISTS.

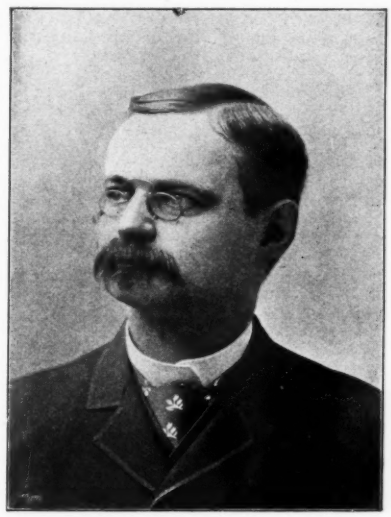
Following is a list of delegates present:

New York City.—Manhattan—I. J. Brown, A. H. Brown, A. W. Reynolds, E. J. Brady, S. L. Malcolm, T. S. Cochrane, Jr., John Boyd, Sam Kline, E. J. Renehan, Joseph Corkery, B. F. Donahoe, T. J. Cummings, John Renehan, W. J. McDermott, Frank Reynolds, T. F. McCaul, Charles Tucker, J. D. McEntee, H. E. J. Schiffer, Philip Brady, W. Kirchoff, M. J. O'Brien, J. A. Rossman, I. J. Barth, M. F. Donahue, J. F. Kelly, L. H. Stroth, T. A. Hill, T. J. Toumey, T. F. Gaynor, J. T. Coyle, C. A. Walsh, A. E. Jackson, J. W. O'Brien, T. Martin, Joseph F. Sweeney William Montgomery, A. E. Smith, I. G. Collins, Philip P. Scott, George M. O'Connor, Paul Euell.

Brooklyn—John Bosch, W. N. Brown, H. M. Noble, E. S. Kelly, J. J. Dixon, T. J. McCormick, Edward MacDonald, Dennis Donegan, S. J. Corcoran, William Eiermann, T. E. O'Brien, G. W. Smyth, J. H. Ebel, J. Moyles, F. X. Meier, George Perry, M. F. Gleason, E. Belford, L. Bfroerer, John Anderson, P. J. Andrews, John Yule C. W. Alexander, Charles Schlinler.

Buffalo—Charles B. Huck, Charles Geiger, Frank L. Beyer, John J. Kavany, George Irlbacker, Thomas J. Kavany, George Engel, Timothy McEvoy, William Caldwell, William H. Martin, Fred H. Yuhl, A. C. Kranichfeld, James S. Stygall, John J. Kavany, E. L. Cook, J. H. Casler, Norman G. Donahue, Samuel Wright, William H. Craighill, Daniel Lund, Joseph Irr, P. C. Comber, E. L. Cook, Charles Smith, Edward S. Franke, Thomas J. Bresnahan, George W. Wood, clerk of Buffalo local.

Elmira—John Walker, Theodore McKnight, Fred Le Valley, R. H. Walker, J. A. Walker.



CHARLES GEIGER of Buffalo,

Rosendale—L. J. Bannon.

Waverly—Fred F. Smith.

Ithaca—E. C. Chappelle.

Batavia—John H. Bradish, Owen C. Steele, W. D. Smith, John J. Russell.

Dunkirk—A. L. Sippel, M. J. Donovan, N. J. Lennerty, J. J. Van De Velde.

Albany—John E. Dugan, Horace F. Westcott, Frank F. Schimpf, E. S. Van Loon, Edward D. Scott, John Girvin, John T. Fitzgerald, John H. Moran, A. J. Eckert.

Troy—Martin Mulligan, William F. Quinn, Samuel Morris, John S. Beck, James J. Powers, Arthur A. Dunn, Edward Murphy.

Rochester—James H. Maher, A. A. Dumond, William G. Reid, George Bay, J. P. Hargather, W. J. Brown, Frederick E. Fladd, D. C. Bascom, Louis Yauchizi, James Kelly.

Geneva—Adam Emig.

Utica—J. D. Batchelor, W. C. Hughes, Charles J. Breen, P. F. Quinlan.

Syracuse—B. Joseph O'Donnell, T. P. Montgomery, W. B. Goldie, M. J. Mooney, Charles J. Dussing, W. L. Benedict, Edward Dunkerton.

Watertown—Charles A. Campbell, H. V. Cook, C. J. Dean.

Binghamton—George Cropper, C. E. Boughton, V. W. Hadley, William Liddell, T. J. Cronin.

Auburn—S. H. Barratt, W. Hurn, Fred F. Irish, John Holihan, H. A. Kerslake.

CONVENTIONETTES.

The Elmira Association, although organized within the past year, is as strong, comparatively, as any in the state, including, as it does, every firm in the city. The following are the names of its officers and members:

President John Walker, 126 South Main street.

Vice-President H. J. Weldner, 221 South Main street.

Secretary and Treasurer Theodore McKnight.

Le Valley, McLeod & Co., 165 Lake street.

R. H. Walker, 112 Lake street.

J. T. Sadler & Co., 336 East Water street.

J. A. Walker, 334 East Water street.

Flahive & Krowl, 115 West Water street.

C. E. Huntington, 129 West Water street.

George W. Krowl, 321 Carroll street.

Harry Bell, 165 Baldwin street.

Burt & Knurr, 518 North Main street.

R. H. Walker, chairman of the local convention committee, is prominent in the political, business and social life of Elmira. He represents the Ninth ward in the Board of Aldermen and stands high in Masonic and Mystic Shrine circles, being president of the Elmira Shrine Association. During and after the disastrous floods which visited this section a short time ago Mr. Walker was chosen treasurer of the relief committee, in which capacity he served faithfully and well.

Several people who inquired "who that distinguished-looking gentleman was" were informed that he was John Holihan of Auburn.

Fred Le Valley made an ideal sergeant-at-arms, courteous, yet firm.

By a coincidence Charles G. Hanchett of Syracuse, P. H. Carney of Utica and William H. Barnes of Troy, who constituted the three members at large of the past year's state executive committee, were all compelled to be absent.

The firm of Dunkerton & Benedict of Syracuse was well represented, W. L. Benedict and Edward Dunkerton both being in attendance.

A New York State convention would not seem natural without Sam Morris of Troy.

J. H. Bradish of Worthington & Bradish, Batavia, made himself popular with delegates and traveling men alike.

John S. Beck worthily represented Lansingburg, which is known as North Troy, since it became a part of that city.

Joseph F. Sweeney and Alex J. Smith of New York are both enthusiastic amateur photographers. They secured a number of views of the Reformatory and other features of picturesque Elmira.

It is not often that W. H. Barnes of Troy misses a convention, and his absence was keenly felt in both the business and social sessions.

I. J. Barth of New York is getting to be quite a parliamentarian. He sat well down in front and offered several motions and seconded several others.

Sam Klein said that while Elmira was not quite as lively as Syracuse, it was a pretty good town at that.

The smoker and supper at Elks' Hall, which wound up the visit, enlivened as it was with speechmaking, music and vaudeville, was very enjoyable—much more so than a "full-dress" banquet would have been.

Greater New York

Office: 89-91 Centre Street Tel. Franklin 1680

ELMER CRAWFORD, Gen'l Manager. G. G. McDuff, Thomas A. Morton, Representatives

Will Visit New York Trade.

The Thatcher Furnace Company, 240 Water street, New York City, have engaged Mr. F. J. Lennox for their steam and hot water department. He will visit the trade in the metropolitan district.

No Complaint to Make.

John J. Garvey, 1136 Third avenue, New York City, reports business as being very good in his territory, where he does plumbing and steam fitting, and one hears no complaints emanating from this enterprising firm regarding a lack of business.

To Plumb Subway Station.

The plumbing in the subway station at Fifty-ninth street and Broadway will be shortly begun by the Tracey Plumbing Company. The same firm are now occupied plumbing the club house and buildings of the new Jamaica race track.

Prices Advance.

The prices on radiators manufactured by the A. A. Griffing Iron Company, of Jersey City, N. J., were advanced ten per cent on March 10th. If pig iron continues to advance it will necessitate another revision of prices in the immediate future.

To Handle Eastern Territory.

The Schlemmer Company have arranged with the F. N. Du Bois Company, 245 Ninth avenue, New York City, to represent and handle their famous Temple vent specialties for the entire eastern territory. These fittings are being used universally throughout the country.

Samuel Lyttle Very Busy.

Business is good with Samuel Lyttle, of West One Hundred and Eighteenth street. Two large jobs are now under way in a large eight-story apartment at the corner of Madison avenue and Seventy-ninth street and eight seven-story apartments on Ninety-first street, between Lexington and Third avenues.

A New Pull on the Market.

Williams & Marvin, Deep River, Conn., manufacturers of tank pulls, finished in oak, antique oak, cherry, red cherry, ash and black enamel, claim to have the best cheap pull on the market. It is called the No. 10 pull. When writing for their catalogue and price list mention Domestic Engineering, which will insure a prompt reply.

Must Get Together.

The first thing that the rival central bodies of the building trades, which have at last come together under the name of the United Board of Building Trades of New York and Vicinity, did was to order all rival trades unions to cease fighting. The plumbers were included in this order, and on March 16th were to decide what form they were to be governed under.

A Neat Hanger.

The Nason Manufacturing Company, 71 Fulton street, New York City, have a very neat large card to hang up in the master plumbers' offices with a large fine picture of their new imperial low down tank and closet complete, called the "Seneca," that can be used to show their customers to take orders by. These can be had by writing them and mentioning Domestic Engineering.

Doing Good Work.

John Renahan, master plumber, 163 East 35th street, New York City, is doing a very good business, he says, in plumbing and heating and is now finishing a very neat job for the new school building, 145th street and Amsterdam avenue, costing $12,000. He has several other contracts that show he does not allow the grass to grow under his feet and claims that there is plenty to do in his line of work.

Busy With Good Work.

Thomas Cunningham, plumber and steam fitter at 172 East Sixty-second street, New York City, has plenty of work to attend to these early spring days. Mr. Cunningham does a general plumbing business and has considerable repair work on hand at all times. He keeps several men employed for this purpose, as well as fitting up new buildings. He is now engaged in refitting the flat house at 120 East One Hundred and Thirteenth street, and is specifying "Standard" goods.

Eel in the Pipe.

Frank Anty is a young master plumber, at 231 Ninth avenue. Mr. Anty has an inventive turn of mind and hopes soon to patent some inventions of his own that will be valuable in his kind of business. Mr. Anty recently had a call to do a job at 44 West Twenty-third street, where the water main pipe was choked up, and upon his opening up the pipe, discovered and took out an eel three feet six inches long.

This intruder he now has in a large glass jar at his office, and which can be seen any time there.

Commencement Exercises at New York Trade School.

The twenty-first annual commencement of the New York Trade School was held in the assembly hall of the school at First avenue, Sixty-seventh and Sixty-eighth streets, on Wednesday evening, April 9. A large number of the parents of the pupils and friends of the school were present as invited guests and greatly enjoyed the exercises. Much favorable comment was heard regarding the excellent work done by the pupils, samples of their work being on exhibition.

Plumber Fails for $93,346.

John Frick, a plumber at 255 W. Twenty-seventh street, has filed a petition in bankruptcy, with liabilities of $93,346 and no assets.

Among the secured creditors are William Pennington, a lawyer of Paterson, N. J., to whom he owed $27,000; and Martin J. Keogh and John J. Jones, trustees of the estate of David Jones, which he owed $25,000.

Among the unsecured creditors are T. G. Knight, of 359 Pearl street, $4,250; J. B. Wentech, of 25 East Seventy-seventh street, $4,950; and McMann & Taylor, of 42 Cliff street, $1,504.

Looks for Fine Trade.

In conversation with Geo. E. Rinkenberger, of the Gurney Heater Mfg. Co., 111 5th avenue, New York City, he reports a most excellent business and looks for even better trade this year than this firm did last, which was a phenomenal year's business for them or any firm handling the same line of goods. Among the contracts recently closed by this firm may be mentioned two 7,000-foot boilers for the Dutchess County Court House at Poughkeepsie, N. Y., and two 4,000-foot boilers for the Dutchess County Poor House, also at Poughkeepsie, N. Y. These are probably the two largest boilers ever sold up the Hudson river. The Gurney apparatus is also being installed in the temporary jail at Poughkeepsie, N. Y.

To Be Used in Carnegie's Castle.

Thomas G. Knight, of Brooklyn, has just received an order from Ayr, Scotland, for some American specialties, which are to be used in Andrew Carnegie's Skibo Castle. The above order came to Mr. Knight through McIlwrath & Cowan Co., of Ayr, Scotland. Mr. Knight is well known in jobbers' and plumbing supplies and keeps on hand not only a general stock, but many kinds of the latest specialties, so that the master plumber can always get what he needs without any delay, and from the indications shown in his store his employes are very busy filling orders, and his business seems very prosperous. Enterprise in keeping up with the times will generally prove very satisfactory to the merchant and customer and bring not only home custom but trade from abroad.

Ordinance Amended.

Through the efforts of the master plumbers of Brooklyn the ordinance which has existed for some time in Brooklyn calling for a special type of fresh air inlet guard has been amended so that the use of the patented device is no longer compulsory. The building superintendent of the five boroughs adopted the amendment about the middle of last month. Section 79 reads: "A fresh air inlet must be connected with the house drain just inside of the house trap. Where underground it will be of extra heavy cast iron. It must extend to the outer air and finish with a return bend, at least one foot above the grade and ten feet away from any window or cold air box. An automatic device, approved by the superintendent of buildings, may be used when set in a manner satisfactory to the said superintendent."

Fujiya.

This is the business or tradesman name of Y. Kano, proprietor of extensive supply depots located at 208 Motomachi, 1 Chome, Kobe, Japan. Mr. Kano is a very entertaining gentleman from our enterprising neighbor in the Orient, and is in this country buying supplies.

He called at the New York office of Domestic Engineering recently to subscribe for the same, which he regards as the most enterprising and finely printed trade journal in the world. He frankly admitted that Domestic Engineering's enterprising methods had reached every point of vantage in Japan, and was looked upon as authority by enterprising Japanese dealers in plumbing and heating lines. Mr. Kano speaks English quite fluently and states that these lines are making marvelous progress throughout his country.

A New Bundy Catalogue.

Domestic Engineering is in receipt of a finely illustrated catalogue of the Bundy steam traps, return traps, separating traps, tank traps, single system, duplex system, vacuum system, manufactured by A. A. Griffing Iron Co. Their New York offices are at 66-68 Centre street, New York City, and works at 449-459 Communipaw avenue, Jersey City, N. J. Buyers of Bundy steam traps are abundantly protected by twenty-three construction, design and trade-mark patents owned or controlled by this company in the following countries: United States, Canada, Great Britain, Germany, Belgium, France and Switzerland. The catalogue contains many fac-simile reproductions of testimonial letters from various representatives and prominent firms that are using their traps throughout the country. Full and complete descriptions of the many

styles of traps and systems manufactured by the above company are adequately covered and illustrated. This catalogue should prove most valuable to all who are interested in the goods that A. A. Griffing & Co. manufacture and they will be pleased to send same on application by mentioning DOMESTIC ENGINEERING.

A QUICK-SELLING NOVELTY.

The Hygienic Disinfector Mfg. Co., 309 Atlantic avenue, Brooklyn, N. Y., has a very valuable disinfector for water closets and urinals that jobbers and master plumbers will do well to see at once, as it is entirely new and practicable and there will be a very large demand for it. It is a very simple brass holder perforated with and is charged with crystals of permanganate of potash, thus deodorizing and disinfecting the water from the flush tank as it is used, preventing fevers and diseases from sewer gases and thus insuring purity of the atmosphere and no odor. They are now ready to fill orders to the trade, as its success has been fully tested in the public schools and other places where they are now in use. J. H. Venners is the patentee and general manager, and will be pleased to demonstrate its valuable qualities or furnish you information if you write them and mention DOMESTIC ENGINEERING. No closet tank is complete without one, and the cost is very moderate and within the reach of all. It is so very simple to handle that any person can put it in the closet tank, even a child 8 years old can do so. See the advertisement in this edition.

A USEFUL INVENTION.

J. F. Oberle, 780 Second avenue, New York City, has invented and put on the market some new fittings that plumbers and steam fitters who have to provide support for heavy drain and steam mains will doubtless be much interested in. These consist of a substantial cast-iron base drilled and tapped for wrought-iron pipe of suitable size for supporting a great weight. The bottom is broad and square and is reinforced at the pipe socket. The rest for the upper end of the pipe standard is designed for different purposes. It is suitable to the use of cast-iron soil pipe and is pitched ¼-inch in order that a soil pipe that runs above a cellar bottom can be firmly supported and the standards, which are of wrought-iron, are so cut as to suit the fitting and preserve the pitch as well.

Hot water storage tanks for supplying apartment houses with hot water are provided with another style of rest, which fits the curve of the tank, securely supports it and saves the plumber labor and expense.

Yet another rest is made for supporting vertical tanks, having a curve which fits the shell of the tank at the bottom. Complete explanatory circulars, showing the fittings and their appliances, will be mailed to all who wish them and write, mentioning DOMESTIC ENGINEERING.

LOSE A GOOD FRIEND.

The plumbers have lost a good friend in Henry Steinert, who until recently has been counsel to the Board of Health for many years, but who lately resigned at the instance of the corporation counsel, who stated the legal work of the Board of Health would be transferred to the Tenement House Board, and that his services therefore were not required. Mr. Steinert was ever ready to take action against a nuisance or to assist a deserving plumber.

NEWARK JOURNEYMEN LOCKED OUT.

Over 350 union journeymen plumbers in Essex County, New Jersey, were locked out by an order issued by the Master Plumbers' Association March 15. The officers of the Plumbers' Union have perfected plans for a struggle, and a long fight is looked for.

The trouble is due to the disagreement between the men and the bosses over one of the articles in the compact between the two organizations on April 1.

After conceding a raise in wages, the master plumbers objected to the journeymen's demand that they be allowed to go out in a sympathetic strike without any notification to their employers. The latter desire forty-eight hours' notice, and when it was learned that the plumbers' union refused even to compromise, a premptory order to lock out the men was given.

BOOMING THE PACIFIC COAST.

It is authoritatively announced in New York City's centers of jobbing activity that the Crane Co. has purchased the entire jobbing establishment of the John Schram Co., Seattle, Wash., which is one of the most extensive jobbing establishments in the West. It is also said that Holbrook, Merrill & Stetson, the extensive jobbers of plumbing supplies of San Francisco, Cal., will also start a large branch jobbing house in Seattle. These recent moves by two of the large jobbing establishments in the plumbing lines indicate the activity which must necessarily follow in the wake of a most prosperous section. It will be but a few years before these cities will rank with the largest in the United States as distributing points not only for the Pacific Coast, but the entire Orient, where trade is developing with surprising rapidity.

UNITED PLUMBERS.

Now that the journeymen plumbers of New York are united in one harmonious organization, they are preparing to meet their employers with reference to joint action that shall improve trade conditions for all concerned. A special meeting of the consolidated union will be held next Monday evening for the appointment of a committee of representative journeymen to meet the master plumbers.

The newly elected officers are: President, John Murphy; vice-president, James W. Hammill; recording secretary, Joseph Crotty; financial secretary, Edward Duffy; treasurer, Charles Murphy; business agents, Matthew F. Murray, Daniel O'Brien and John Corcoran; directors, William Huggard, William Fitzgerald, Thomas Wagner, David Devlin and John Riddell; trustees, Thomas Brady, James Mullarkey and Bernard McGuire.

The union will continue its meetings at Mænnerchor Hall every Monday evening, and the board of directors will meet in the same hall on Friday night.

A HANDY CEMENT.

The W. H. Stewart Mfg. Co., 105 John street, New York City, are manufacturers of the W. H. Stewart iron fiber proof cement. This cement is needed by all tinners, slaters, roofers, builders and houseowners. It is said to be the most durable, reliable and convenient cement on the market for cementing joints around chimneys and skylights, for repairing defective places in tin, iron or slate roofs; for repairing shingle roofs, for fastening loose and broken slates in slate roofs, for bedding slate and tile on flat-roofed buildings, for making permanently water tight all kinds of work. This cement is composed of indestructible fiber and iron oxide thoroughly incorporated with a pure oil composition, in a plastic form, ready for use, to be applied with a trowel or similar tool. It is said to firmly adhere to all surfaces, will not crack or peel off, and will not become brittle. When applied to the work it slowly hardens into a leather-like surface and retains its elasticity. The cement will keep indefinitely in the packages without deteriorating and is made in three colors, red, slate and cream color, and is put up in 5, 10, 20, 40 and 100-pound pails.

ORGANIZED LABOR SCORES VICTORY.

The long continued struggle for supremacy in New York City between the Steam Fitters' Union and a K. of L. assembly of the same craft has been finally settled by the Court of Appeals. It is now lawful in New York State, with the authority of the highest tribunal, for a single workman or a body of laborers to strike rather than work alongside an objectionable fellow craftsman.

Various reasons may be tenable for such refusal to work. Chief Justice Parker makes a new point in favor of organized labor. He quotes the common law principles of "assumption of risk" to justify the determination of a workman to choose as co-employes workmen whose carefulness will help to protect him against injury by accident for which there is no redress at law. In other words, Justice Parker, writing this decision, says:

"So long as workmen must assume all the risk of injury that may come to them through the carelessness of co-employes they have the moral and legal right to say that they will not work with certain men, and the employer must take their dictation or go without their services."

The smaller labor organization secured an injunction from a lower court restraining the Steam Fitters' Union from striking against members of the other organization. The case was taken by Lawyer Alfred Steckler to the Appellate division of the Supreme Court of New York County, where, on his arguments, the injunction was dissolved. The K. of L. steam fitters took an appeal from that decision. Alfred Steckler having since then been appointed to the Supreme Court bench, his brother Charles took the case on behalf of the Steam Fitters' Union, and argued for the affirmance of the Appellate division's finding, with the result that the injunction was finally dissolved, on these grounds, stated by Chief Justice Parker:

"The defendant association, as appears from the findings, wanted to put their men in the place of certain men at work who were non-members, working for smaller pay, and they set about doing it in a perfectly lawful manner. They determined that if it were necessary they would bear the burden and expense of a strike to accomplish that result, and in so determining they were clearly within their rights.

"A labor organization is endowed with precisely the same legal right as is an individual to threaten to do that which it may lawfully do."

It is noteworthy that the lawyers who have handled this important case and the presiding judge who wrote the decision of the Court of Appeals are widely known as friends of the wage-working masses, as well as just advocates and interpreters of the law. Alfred Steckler was the choice of the labor organizations when elected civil justice in 1887; he and his brother Charles have since been the attorneys of various New York unions, and Chief Justice Alton B. Parker was first nominated to his present exalted position by the Trades Council of Kingston, his home city, in 1897, and immediately thereafter the central labor bodies throughout the state entered the campaign that resulted in his election by 90,000 majority.

You never will find time for anything. If you want time, you must make it.—*Charles Buton.*

Boston & New England

Office: 32 Oliver Street Tel. Main 3036

ELMER CRAWFORD, General Manager. E. C. Stokes, Representative

SCHOOL HOUSES.

The Metropolitan School Board are opening bids for school house plumbing very frequently these days and many good-sized contracts have been let.

GOING ON A VACATION.

Daniel Lewis, of 12 Marshall street, Boston, an old time and well known plumber, is arranging to visit Bermuda. He expects to start on the 18th inst.

PUSHING IT.

The Warnock M'f'g. Co., of 22 High street, Boston, are pushing the sales of their Warnock wrench for smooth and polished pipe. It is so simple—so efficient.

NOTICE THE CHANGE OF ADDRESS.

The Boston office of the Niagara Radiator Company, under charge of T. F. Guyon, has removed from 73 Oliver to 200 Franklin street, where he will be glad to see his friends.

A NICE CONTRACT.

The Henry N. Clark Co., of Union street, Boston, are just finishing installing the Paul system of heating in the large building of the Geo. G. Fox Co., corner of Edgeworth and Farren streets, Cambridge. Electric motors will furnish the power.

STILL BUSY.

C. E. Harris & Son, of Plymouth, Mass., have been fortunate in being kept busy all of this winter. They are now installing a new heating plant in the Masonic block of their city. They will use a Wm. H. Page Co.'s "Volunteer" Boiler and Exeter Radiators.

IT'S TRUE.

"Carload" DeWolfe, local agent rfo Sweet & Doyle, sales agents for Big Four and Vincent Valves, says his cognomen has become a fact, and that his increased facilities at their new office, 283 Franklin street, simply means carloads of business.

REMOVED.

The Boston office of the Powers Regulator Company, of Chicago, has removed from 224 Franklin to 200 Franklin street, where the genial Mr. Morton is awaiting calls from his friends. Their facilities have been largely increased and office room made more comfortable.

HAS INCORPORATED.

F. A. Wendell, of 64 Huntingdon avenue, with branches in Salem, Watertown and Newton, Mass., has incorporated his business under Maine laws and will continue under the name of the Wendell Plumbing & Heating Co., of which Mr. Wendell will be president. He reports business very good with the new company all along the line and also that he has just closed a $10,000 job in Brookline.

CHANGED HIS HOUSE.

A. E. Dart, until lately with Blake & Andros, of 28 Portland street, Boston, makers of the famous B. & A. valves, has accepted a position with the George S. Roberts & Bros. Co., of 471-473 Fourth avenue, New York. Mr. Dart's large acquaintance with the steamfitting trade should make him a very valuable man to this company, and DOMESTIC ENGINEERING wishes him all success in his new venture.

A NEW TESTING PLUG.

Walter Westwood, of 61 Harvard street, Boston, a prominent plumber in his district, has the patents of a new testing plug that promises much. In construction it is extremely simple and can be cheaply made. Mr. Westwood is desirous of disposing of the patent to some manufacturer to handle and put on the market. This should prove an opportunity for some good concern. Write him direct, and mention having seen it in DOMESTIC ENGINEERING.

A HANDSOME DISPLAY.

The Wm. H. Page Boiler Co. of 32 Oliver street, Boston, have in one of their windows views of the marble palace of E. J. Berwin, the millionaire coal baron of Philadelphia, at Newport, R. I., which is heated with three Page sectional and one Volunteer boiler. In the city of palatial homes, the new home of Mr. Berwin is noticeable for its elegance both in appointments and design. The views given are well worth careful inspection, and Mr. Davenport is to be congratulated upon the handsome way in which he has arranged and framed them.

BEAT THE ORIGINALS.

Wm. H. Mitchell of Wm. H. Mitchell & Son, the plumbers at 1 Province Court, one of the foremost plumbers of Boston, in speaking of DOMESTIC ENGINEERING monthly edition for March says. It certainly is the acme of printing and the handsomest trade journal I ever saw. The cuts you have made from flash light photographs of the M. C. M. A. Trade school in the basement of the Mechanics Building come out really better than the finished photographs. Each one is worthy of a frame. Our members will be very much interested in this work and I shall need some extra copies."

A HANDSOME MEMO. BOOK.

The Walker & Pratt Mfg. Co., of 35 Union street, Boston, makers of the New Walker sectional and Crawford round portable boilers, are sending their friends in the trade a superior memorandum book bound in black seal leather. On the first cover, stamped in gold, is "Compliments of Walker & Pratt Mfg. Co.," and on back an internal view of the New Walker steam boiler. On the inside is found a complete list of both the New Walker and Crawford boilers, giving number, size, ratings, and price. The inside back cover is taken up with a pocket for special memos. and stamps. They will send you one if you mention DOMESTIC ENGINEERING.

A NICE JOB.

Mr. T. E. Muldowney, of 50 Walnut street, Brookline, is now busy with plumbing the New Manual Training school in that city, which when completed will be one of the finest school buildings in the state and will cost exclusive of site over $100,000. Mr. Muldowney's contract for plumbing amounts to $5,378 and contemplates the installing of 12 Huber Bostonia water closets and fixtures, 10 of Motts Metropolitan Urinals, 50 lavatory bowls set in sections and about a dozen of Motts Hygienic Basins set snugly. The building is supposed to be completed by May 1st, and is progressing finely. The plumbing is all roughed in and tested and drainage consisting of 6 inch, 5 inch and 4 inch pipes all down. Mr. Muldowney also has some other good ones on hand and like all good plumbers in this section is wearing out his stock of pencils figuring on 1902 work.

A NEW CATALOGUE.

The Walker & Pratt Mfg. Co., of 31-35 Union street, Boston, makers of the new Walker boilers, have issued their 1902 catalogue of these boilers. It is a handsome book 8½x11½ inches, of 12 pages, bound in gray mixed antique cover-paper. The printing and illustrations are of the highest order, the illustrations practically giving in minutest detail the construction of the new works. Each illustration is most carefully looked after, and as carefully drawn as any work of art. Each series is fully taken up, measurements and ratings carefully and conservatively computed, shipping weight and prices given. The claims for the new Walkers are set forth in full and the catalogue made really a work of reference of value to all steam fitters. Jno. A. Fish, manager of the wholesale department, will be glad to mail you one if you will mention DOMESTIC ENGINEERING.

SOIL PIPE SCARCE.

Boston is troubled right at the beginning of a most strenuous season with a shortage of soil pipe. Not that orders have not been placed with the manufacturers, as many of the supply houses bought liberally as far back as January, but the actual stock on hand is short, and as manufacturers can give no certain promise of delivery on account of shortage of both iron and cars, the situation is one that is most keenly watched just now. Again, a factor, according to one of the prominent founders, is the large amount of this pipe being shipped to Havana. He says: "Havana will demand more soil pipe in 1902 than will go to the city of Boston to supply the New England territory." Under ordinary circumstances this would easily be taken care of, but the general extraordinary demand for all sorts of iron has made the steel companies very heavy purchasers and driven the small man to all kinds of expedients to get hold of the pigs. The whole matter will bear watching closely.

RETURNS 100,000 PER CENT BETTER.

Mr. L. E. O'Meally, the plumber, of 12 West Denham street, Boston, arrived in Boston on Monday, March 31, after a six weeks' stay in Port Antonio, Island of Jamaica, the home of the succulent banana and thorny pineapple. Mr. O'Meally has had this visit in his mind for some years and almost welcomed the instructions from his physician to take a sojourn on its beautiful shores in order to fully recover from a severe attack of blood poison. From Port Antonio Mr. O'Meally traveled well over the island, taking in all points of interest and enjoying every moment of his stay. He says it is the one place for tired and weary man to seek health, "the place that every man wants to visit before he dies, and then never wants to die." The banana trade of the island is a revelation; the steamer that brought Mr. O'Meally back to the "center of culture" brought 36,000 bunches, and is only one steamer of some twenty-eight different lines constantly loading for different parts of the world. As to his health, Mr. O'Meally's friends will be glad to learn that he says "at least 100,000 per cent better," and ready for business once more.

A CHARMING VACATION.

F. W. Crozier, whose shop is at 30 W. Canton street, Boston, and who is well known by his brother plumbers in Boston, returned last Friday, March 28, from a month's vacation trip to California. Mr. and Mrs. Crozier left this city February 28 en route to San Francisco, making short stops at Cleveland, St. Louis, New Orleans, Los Angeles, Pasadena and San Diego, in Southern California. From the last named place they took in a trip up Mt. Low, of which Mr. Crozier speaks very enthusiastically. The trip began via trolley to the foot of a sharp inclined plane, up which they were pulled by cable, then further by trolley, finishing by a two hours' trip on mule back—"the only old-fashioned trolley of the plains and mountains." The scenery

was wild and grand and embraced some of the most fertile valleys of lower California as well as some of its most barren spots. Then on to San Francisco to spend a week with a brother whom he had not seen for over twenty-seven years. With the many new sights to see in this far-off city, in such a company, it is no wonder the week slipped away all too quickly. The journey home was made through Salt Lake City, with its great dead inland sea, its Mormon temple and its many-wived men. Denver, the Silver City of the Mountains, was also visited for a short time on the way to the Athens of America—the Hub—where arrival was made on good time, in great health and spirits and with some Western breezes still clinging to his apparel.

OBITUARY.

Robert D. Morrison, the late head of the sprinkler department of the Walworth Mfg. Co., of 132 Federal street, Boston, died of neuralgia of the spine on March 21, at his home on Vernal street, Everett, Mass., and was buried on Monday, March 24, from his late residence. He was forty-seven years of age, and leaves a wife and eight children, the eldest of whom is a little girl of fourteen years, and the youngest a boy of about three. Mr. Morrison began his connection with the Walworth Company some eighteen years ago as shipping clerk. He was later placed in charge of the gas department, and still more recently placed at the head of the sprinkler department.

His many sterling qualities and genial,

THE LATE ROBERT D. MORRISON.

gentlemanly ways made him friends wherever he went, and at the time of his death he was one of the best known and most popular men in his line in the United States, a whole-souled, splendid gentleman, whose looks portrayed his fine, manly character. In his death the Walworth Mfg. Co. loses a valued and trusted employe whose place will be hard to fill, and the trade in general a loved and lovable companion.

Mr. Morrison had not been enjoying good health for over a year past, and was sent south by his firm last year to remain until improved in health. From this trip he seemingly received much benefit and returned to his work feeling much improved; but the improvement did not last, and after a sickness of a few weeks death claimed him as its own. The Walworth Mfg. Co. has placed a large laurel wreath suitably inscribed, in its show rooms to his memory. Would there were more men like him; this world would be better and brighter for their lives.

Massachusetts

A DISCIPLE OF IZAAK WALTON.

Geo. R. Estabrook, the prominent plumber and heating engineer of 146 State street, Springfield, has just returned from a month's vacation, spent in Bermuda. Mr. Estabrook brought with him several hundred pounds of angel-fish, which he had caught "just off the reefs." He is now fishing for orders with renewed enthusiasm.

ARE VERY BUSY.

Kearns Bros., Holyoke, Mass., plumbing and heating contractors, are very busy with a number of contracts, and they have quite recently installed about 25 new heaters. This firm has completed a new pipe shop, 30x50 feet, well equipped for this department of their work, their machinery cutting six inch pipe. This shop is in the rear of their building at the corner of Main and Spring streets.

PUSHING IT.

J. E. Wakefield, of 89 Exchange street, Worcester, Mass., is pushing his Wakefield pipe wrench and clamps for brass, nickel-plated and finished pipe through general and local agents. The wrench is claimed to be a tool which will not crush the pipe or catch when in use in close quarters and can be used as a pipe or rust wrench. The clamp holds finished pipe without defacing it, either for brush or wrench work. Write for further particulars, mentioning DOMESTIC ENGINEERING.

Rhode Island.

BUSINESS GOOD.

Murphy & Fries, of 31 Eddy street, Providence, have been busy during the entire winter and report many new jobs in sight.

BUSINESS IN SIGHT.

Providence in common with Boston is feeling the effects of a building boom. The past winter has been especially favorable to plumbing work and the general building trades, and a fair quantity of work has been accomplished. Just now most jobs have been completed, but plumbers are busy with their pencils for contracts later on.

TO DO WORK IN CONNECTICUT.

G. W. Thornley, of 82 Orange street, Providence, has the contract for plumbing the summer residence of W. N. Bartlett at Gilford, Conn. The water will be obtained from a spring about 800 feet from the house. There will be two bath rooms fitted complete with all modern sanitary appliances. The stable will also be piped and supplied with the same appliances for use with cattle and horses.

INFORMATION WANTED.

The Providence Master Plumbers' association through Mr. Thos. J. Murphy, of 31 Eddy street, Providence, R. I., the secretary of the association, is desirous of obtaining reliable information regarding the laws, as they now exist, in reference to board of examination on eligibility of persons to become either master plumbers or journeymen. Any information that our readers can furnish on this subject may be forwarded direct to Mr. Murphy, who will be very glad to receive it and will acknowledge same. The Rhode Island association has now a bill before the legislature of that state covering general plumbing laws somewhat similar to the laws already in force in Massachusetts and looking toward needed improvements in Rhode Island. Mr. Murphy, with an idea of getting a thorough general knowledge of the subject in hand, would also like to obtain a general list of questions likely to be asked by the examining board of such cities as now have such boards and will treat any information on this subject as confidential. As nearly all cities of the first, second and third class now have such boards we trust some brother in the association will help what he can to push along the good work in Providence and will give Mr. Murphy the benefit of his knowledge.

New Hampshire.

HAVE INCORPORATED.

The business of complete housefurnishing and heating and plumbing heretofore conducted at 73 Factory street, Nashua, N. H., under the name of C. H. Avery, which was established in 1887, has been incorporated, and will hereafter be known as the C. H. Avery Co., and Hiram W. Brooks, Geo. A. Davis and David Pinet, who have been with him for many years, have taken an interest.

The business will be conducted as heretofore, with Hiram W. Brooks as manager of the plumbing and heating department, and C. H. Avery as president and treasurer.

Maine

ARE COMPLETING LARGE CONTRACT.

Messrs. E. H. Babb & Co., of Exchange street, Bangor, Me., the well known plumbing and heating concern, have nearly completed their contract amounting to over $14,000 in plumbing and heating the new Higgins classical institute, at Charleston, Me. The fixtures used embrace 14 Melbourn closets supplied with Neptune ush valves, 12 Imperial porcelain lavatories and three ranges of closets, in all 54 fixtures which are all Dalton & Ingersol's well known makes. The heating is now completed and six Henderson boilers made by the Prezer-Painter Co., of Reading, Pa.

ROUGH ON SMITH.

Occasionally the boys on the road break out in funny streaks, and Raymond P. Smith, the genial traveling man of the Callahan Supply Co., of Worcester, got into one of these breaks recently at the Bangor House in Bangor, Me. The boys took an opportunity offered by Mr. Smith's absence in the evening to visit his room and play cyclone with its furnishings, and when Mr. Smith wanted to engage the ringleader in mortal combat, said leader was pointed out as a bold Westerner who would shoot on sight. Discretion was accepted as the better part of valor and the boys now sing, "Ain't it a shame, a measly shame," when they meet our old friend Smith.

GET CARLOAD LOT.

W. L. Blake & Co., of Commercial street, Portland, have just received a carload of specialties from the Ideal Mfg. Co., of Detroit, Mich., and expect a big run on Ideal goods this year. They will also act as agents for the Day Metallic Mfg. Co. in the Maine territory. Mr. Blake, in speaking of the business prospects in his section on Thursday last, said: "This year promises to be the best in our history. Goods are moving freely and there are many buildings proposed or just contracted for. With our large facilities in this new building we shall be much better able to take care of trade than ever before and shall have a fine large stock always on hand from which to make prompt shipments and quick deliveries. This will mean a great deal to the plumbers of this neighborhood."

LEWISTON BUSY.

The floods of Maine did not skip Lewiston and neither has the good-time boom. All of the plumbers are now fairly busy and there is much more business in sight. The floods helped make some work for the plumbers and steamfitters, as where work was carried down with the rush of waters, new work has been begun, and thus an ill wind blows somebody good. The Carman-Thompson Co. have been busy all winter and now have many nice jobs on hand and are figuring on a great amount of new work. A. L. & E. F. Goss Co. report good business in all of their various lines. They decorated one of their large windows for Easter with a brood of small chicks that proved a great drawing card, and kept a crowd around the window a large part of the time.

Philadelphia

Office: 18-24 S. Seventh Street **Telephone 21-41**

ELMER CRAWFORD, General Manager. **Frank P. Turner, Representative**

WILL TRAVEL IN THE SOUTH.

Fleck Bros Co., 44-50 North Fifth street, have engaged Edward J. Walter as their traveling representative in the southern territory. He will cover that section as far as Louisiana and Texas.

CHANGE OF NAME.

The Duquesne Supply Co., of Pittsburg, jobbers in plumbing supplies, have changed the style of firm name to the Duquesne Sanitary Co. The change is in the style of name only and in no way affects the business of the company.

GOOD WORK AT GLENSIDE.

Skilled, modern alteration work is a specialty of Harry B. Lentz, whose plumbing establishment is at 449 Poplar street. He has a good contract on hand at present out at Glenside, consisting of an entire remodeling of the plumbing in a large residence there which has lately been purchased by R. Davis Carey.

NICE LOCATION—GOOD TRADE.

Wm. E. Stockley, the plumber and gas fitter of 4529 Springfield avenue, West Philadelphia, has been located in that desirable neighborhood for the past seven years and enjoys a steady patronage which keeps him constantly busy. He never touches new work, but devotes all his time to alterations, repairing and jobbing.

HEAT FOR FRIENDS' HOME.

Robert E. Morris, of 2132 East Orleans street, has a good contract on hand for heating the Home for Aged Friends, at Kennett Square, Chester Co., Pa. The building requires 1,000 square feet of radiation, which will be supplied by an American boiler and Touraine radiators.

RESIDENCE WELL HEATED.

Kriebel & Co., 826 Spring Garden street, are installing the Vapor heating system in the new residence being erected for Dr. Edmund H. Kase, on Boyer street, Mt. Airy. The boiler is a Capitol, and there will be several different kinds of radiators, Fowler & Wolfe wall radiators, some Rococo radiation and a Niagara window-seat radiator.

HAVE OPENED PHILADELPHIA OFFICE.

The National Radiator Co., of Johnstown, Pa., have taken an office and display space on the exhibition floor of the Builders' Exchange, 18-24 South Seventh street, where they make an impressive showing of their varied line of radiation. The National's Philadelphia, eastern Pennsylvania and New Jersey business is in the capable hands of Mr. O. Peirce.

PLUMBING AND HEATING.

H. L. David, of 2813 Germantown avenue, is at work on the contract for the heating and also the plumbing for the business and residence block being erected at the corner of Richmond and Ann streets, by builder Philip Haibach. The building will be heated with hot water by a Mercer boiler and Royal Union radiators. The plumbing fixtures include a roll rim enameled bath tub, syphon jet closet and marble top lavatory.

A GOOD MOVE.

The plumbing and gas fitting firm of Hoft & Sneller, who several months ago removed to 653 Franklin street, from Seventh, below Spruce, say they have no reason to regret the change. They find more business and better business in their new location and are looking forward to a prosperous season. They have two branch offices, a down town office at 807 Passyunk avenue, and an up-town branch at 1437 North 8th street.

DWELLING AND FACTORY WORK.

J. Ernest Schenck, whose neat little shop is situated at 679 North Broad street, near the junction of Ridge and Fairmount avenues, is doing a good residence job for Mr. Schober at Langhorne, Pa., which consists of overhauling all the plumbing in the house and installing new fixtures from Haines, Jones & Cadbury Co. He is also engaged on an extensive plumbing drainage and sewering contract at the works of Brinton & Brosius, the soda water manufacturers at 17th and Vine streets.

LABORATORY PLUMBING AT U. OF P.

Boon & Sample, 137 South Tenth street, have just begun work on the plumbing contract for the new medical laboratory at the University of Pennsylvania, for which Cope & Stewardson are the architects and Stacy Reeves & Sons the general contractors. McCambridge & Co.'s goods will be used throughout. There will be a number of their Zenith closets, with flushometer attached, and a number of their Ortley basins. Altogether there will be seventy solid porcelain Class A sinks in use in the different departments. It is expected that the building will be completed and ready for occupancy by the first of April, 1903.

NICE RESIDENCE PLUMBING.

Some good fixtures and good work are being put in the residence at 706 North 40th street, the plumbing of which is being completely remodeled by Frank J. Eustace, of 4417 Lancaster avenue. He is using goods from Fleck Bros. Co., a Neptune low down syphon closet, Tennessee marble lavatory, roll rim enameled sink, anti-freezing hopper, etc.

In the residence of H. Wolfendon, the carriage builder, at 863 North 40th street, Mr. Eustace is fitting up an unusually pretty bath room. The roll rim enameled tub is furnished with standing waste and all nickel metal work. The closet, which is of the low down, syphon jet type, is of best quality. The all porcelain lavatory is of a handsome pattern.

CONSUMES SMOKE AND SAVES COAL.

The New Century Engineering Co., recently organized and located at 1507 Sansom street, are the proprietor of a furnace for steam boilers, which is a fuel economizer and smoke consumer. It is claimed for it that it will effect a saving of 20 per cent in fuel, 20 per cent in labor and will give an increase of capacity of 20 per cent. It will burn any kind of coal and can be attached to any kind of boiler. To install the apparatus does not require more than two days, no tall stacks being required. It returns the gases to the fire and burns them; no cold air ever enters the fire. The officers of the company are F. D. Maxfield, president; G. O. W. Arnholt, treasurer; H. B. Sharps, secretary.

BERMUDA'S IRELAND.

The Steward & Romaine Mfg. Co., 124 North Sixth street, are the largest exclusive manufacturers of expansion bolts for all purposes in the country. They booked a large contract a week or so ago from the English government for supplying a large consignment of their goods for use in the Bermuda Islands. One of this group is named Ireland, though far more chalky and not so verdure-clad as the real Emerald Isle, and here the construction department of the government is erecting new docks and stone piers. The before-mentioned order is for a large number of huge hitching-ring expansion bolts, for providing fastenings on the piers for the cables of steamships and other vessels. It goes without saying that for this purpose the fastenings must be of the strongest character. The contract runs up into big figures.

CONTRACTS AT HOME AND ABROAD.

Hoben & Doyle, 21st and Pine streets, have a number of plumbing operations on hand in the city, in the surrounding towns, and at a distance. At Rockwell, Conn., taining seven or eight bath rooms, for Francis E. Maxwell. Mott's solid porcelain goods are being used in all, and the supply piping is entirely of brass. They are also doing the plumbing for a fine residence and stable for John Thompson Spencer, at Devon, Pa., and the residence and stable of Frank J. Hipple, at Bryn Mawr.

In Philadelphia they are pushing along the work in the Girard National Bank building on Third street, below Chestnut, which belongs to the Stephen Girard estate, and they also have the plumbing contract for the store and office building at 1207-09 Chestnut street, for A. A. Zane.

Messrs. Hoben & Doyle are making good progress with the plumbing equipment for the State Capitol building at Jackson, Miss., on which they have been at work for some time.

WILL GO TO ALTOONA.

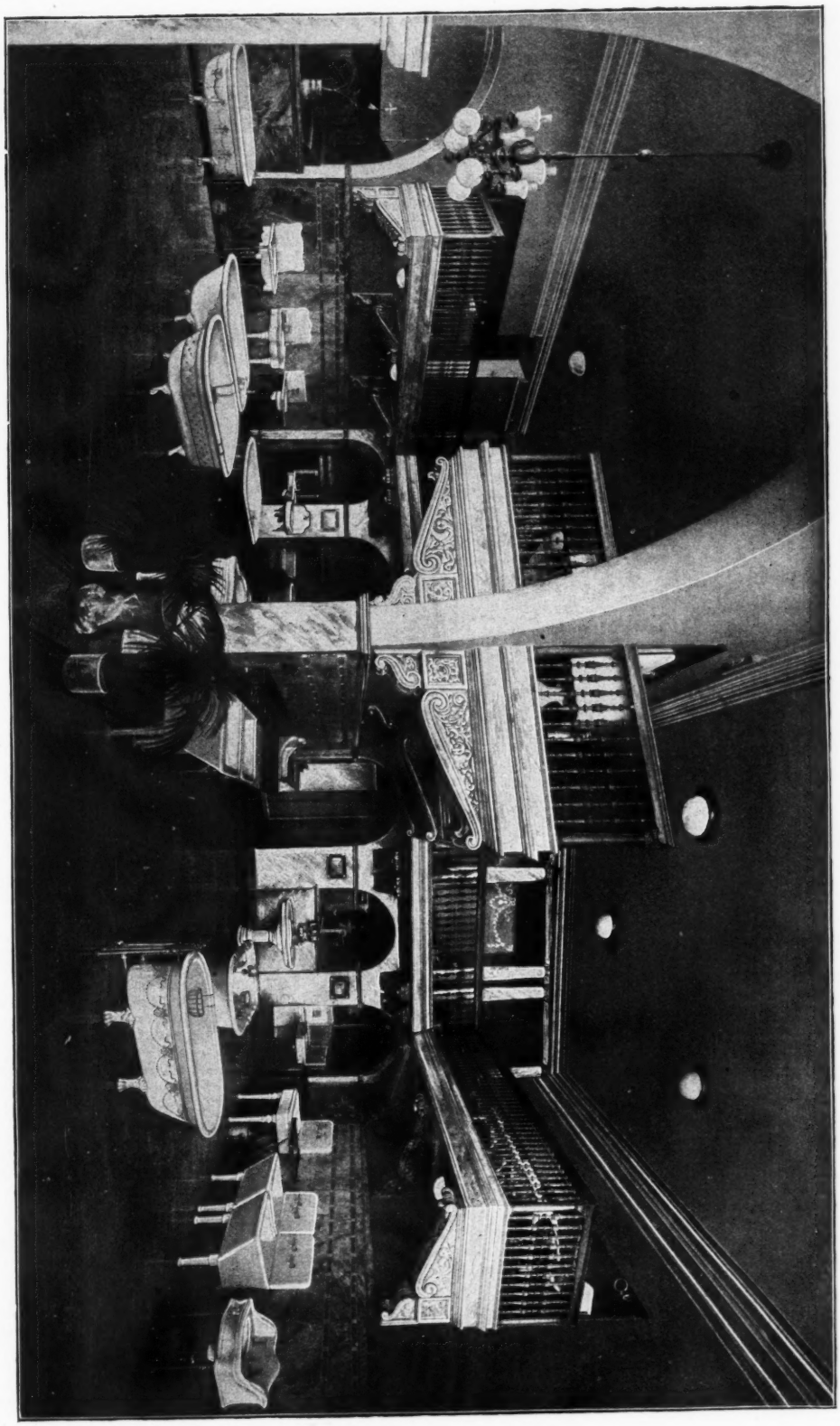
At the last monthly meeting of the Master Plumbers' Association of Philadelphia, the following list of delegates was elected to attend the annual convention of the State Association at Altoona, which will be held on Tuesday, April 15:

George F. Uber, president of Philadelphia association, delegate by virtue of office; Louis J. Sommer, president State association, delegate by virtue of office; Robt. J. McNally, secretary of State association, delegate by virtue of office; William S. Clark, ex-president of State association, delegate by virtue of office; Robert Drummond, ex-president of State association, delegate by virtue of office; William H. Doyle, ex-president of the National Association.

C. S. Warfield,
William Leitch,
John Gormly,
Walter Jones,
William McCoach,
John V. McNally,
S. Louis Barnes,
William Harkness,
Howard Neilson,
J. F. Dwyer,
A. M. Hicks,
Howard Smith,
Gregor Drummond,
E. Frank Paullin,
John E. Eyanson,
H. L. Righter,
Joseph V. Reagan,
Frank P. Brown,
Harry Boon,
D. V. Kennedy,
E. H. Mackay,
Frank Boon,
C. W. Groeling,
Isaac T. Hirst,
Frank Welsh,
Thos. J. Barry,
W. W. Mentzinger,
Godfrey Krouse,
Harry B. Lentz.

FINE BATH ROOM SPECIALTIES.

J. W. Van Meter & Co., 1019 Spring Garden street, manufacturers of brass and nickeled traps, lavatory legs, brackets, etc., are agents for this territory for the complete and elegant line of bath room and lavatory accessories made by J. P. Eustis Manufacturing Co., "The Brasscrafters," of Boston, Mass. Their products include an extended assortment of soap dishes, sponge and brush holders, towel bars, boilers and shelves, bath tub seats, tumbler holders, plate-glass mirrors, toilet paper holders, etc. Messrs. Van Meter & Co. have recently re-

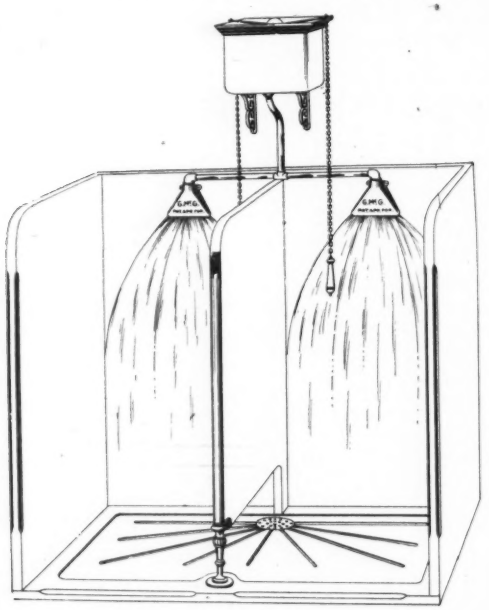


The handsome exhibit of sanitary goods in the showrooms of Haines, Jones & Cadbury Co., Philadelphia.

ceived from Boston a limited supply of an elaborately illustrated forty-eight page catalogue of these goods which is a gem of the engraver's and printer's art. Heavy enameled paper is used, and the cuts are of the very highest order. The front cover presents a striking illustration in colors of a group of foundrymen, or brass molders, at work, and the back shows an ideal bath room of unusual beauty. While they last any member of the trade can secure a copy by sending a postal card, mentioning DOMESTIC ENGINEERING.

A Superior Spray.

The accompanying cut illustrates the G. McG. urinal spray, made by the G. McG. Manufacturing Company, 1015 Christian street, Philadelphia. This spray obviates all bad features of the present jets, and operates from tank system. It gives a spray of water three feet across; will not splash, as the construction of mouth throws all water



direct against slab, thereby preventing the splashing of shoes, and keeping the floor dry. It also causes the water to fall with great force from spray to floor on slab, keeping the slab clean. An important feature of this spray is that no matter how much dirt accumulates in the mouth, the water will spray all across the slab; it is self-cleaning.

One-sixth gallon tank, with 1¼-inch flush pipe and four sprays, will flush a 10-foot urinal, thereby saving water rent.

A Superb Catalogue.

The new catalogue just isued by Haines, Jones & Cadbury Co., 1128 to 1144 Ridge avenue, Philadelphia, is both a work of art and a compendium of useful information for the master plumber and the master steam fitter. An idea may be formed of its scope and comprehensiveness from the fact that it contains 711 pages devoted to description, price and illustration, covering almost everything imaginable in up-to-date plumbing supplies.

The work is printed on fine enameled paper, many of the illustrations being handsome half-tones gotten up especially for this book. The binding is substantial and the gold stamping on the front cover and backbone of the volume is distinctive and unique. A feature that strengthens the individuality of the production is that each and every page bears the firm's trade mark, a medallion containing the figure of William Penn. The frontispiece is a fine half-tone engraving showing a view of their richly fitted up show rooms.

Thirty-five pages are given up to the different forms and varieties of enameled iron ware, including bath tubs, shower baths, foot baths, lavatories, sinks, etc. The catalogue then goes on to illustrate this company's large and complete line of "Regal" solid porcelain ware. This comprises an impressive showing of bath tubs in elegant patterns, a variety of gracefully designed lavatories with Hajoca overflows, slop sinks, laundry trays, kitchen sinks and drinking fountains.

Of all the diversified productions of Haines, Jones & Cadbury Co., the highest grades bear the name "Hajoca," and on the excellence of the goods so entitled they are willing to stake the house's reputation. Hajoca brass work manufactured by them, the various patterns of which are here shown, is no exception to the rule. Fuller, compression and ground key work are all presented in complete assortment. These goods are carefully made of the best materials and guaranteed to be equal to any on the market.

One of the latest patented specialties illustrated is their connected waste and overflow combined with trap, which forms a neat and stylish fixture. While this was only recently brought out, a large number of orders for it have already been received.

The celebrated Flushometer, for which Haines, Jones & Cadbury Co. are exclusive agents for Philadelphia and tributary teritory, is given a prominent place in the volume. A number of cuts are shown illustrating its adaptability to closets, urinals, slop sinks and other fixtures where a quick, effective flush is required. This is followed by several pages of names of fine residences, public buildings, hotels, hospitals, etc., in which the Flushometer is in use.

Considerable space is devoted to soil pipe and fittings, of which this company manufactures an extensive and very complete line at their foundry in Norristown, and which, for quality, accuracy and general reliability, bear an enviable reputation wherever known.

Kelsey Furnace Satisfies.

Wm. Kaiser & Son, the plumbing and heating contractors at 153 South Main street, Wilkes-Barre, are agents for this vicinity for the Kelsey warm air generator, made by the Kelsey Heating Co., of Syracuse, N. Y. During the past season they have put in quite a number, of various sizes, in residences and other buildings, and in every case they have given more than satisfaction.

Rich and Unique Show Rooms.

The new show rooms of Haines, Jones & Cadbury Co., 1128-1144 Ridge avenue, Philadelphia, are without doubt among the handsomest in the country. Their arrangement is distinctive, tasteful and practical, and the general effect is a delight to the eye.

The displays are arranged on the ground floor and on balconies supported by arches and heavy carved brackets. The general lines of decoration are classical, Sienna marble finish predominating. The tile work is by Sharpless & Watts, executed in their best style. Pendant from the ceilings near the front are two handsome chandeliers, made in special design to harmonize with their surroundings. The illumination is supplemented by a number of dome lights, which give out a powerful but softened radiance. The rooms present an especially brilliant picture as viewed from the street in the evening. A feature of the exhibit is a number of completely furnished bath rooms, eight in all, several on the first floor and the remainder on the balcony floor above. These are fitted up to present not only a variety in style of fixtures and accessories, but also a wide range in cost, showing combinations to suit almost any pocketbook.

One of the finest bath rooms is set off with Numidian marble wainscot and mosaic floor. The bath-tub is of solid porcelain, as is also the hip bath and combination needle and shower bath. The lavatory is of richly grained onyx and the "Hajoca" closet, with Flushometer, is handsomely decorated.

Another is all Italian marble, with inlaid tile decorations on the walls and marble shower stall in one corner. The gold decorated Hajoca closet, with birds-eye maple seat, has the Flushometer and nickel-plated bidet attachment, with hot and cold water.

One of the most attractive is decorated in Pompeiian style, the design for which was especially originated for this room. It contains a Continental solid porcelain tub, onyx washstand and earthen pedestal bidet.

One bathroom contains a heavy oval marble lavatory, made from statuary marble so pure that from a short distance it looks like porcelain, but a close inspection shows it to be more beautiful than porcelain.

One or two of the outfits show that a neat and pleasing bathroom can be gotten up at a very moderate cost, the prices being as low as is consistent with good material. Liberty bath-tubs occupy a prominent place in several of the displays. Nearly all the compartments are tiled and frescoed in harmonious designs. A unique feature is that each room can be lighted up instantly by touching a button, but the lights themselves are invisible to the spectator.

The balconies as well as the lower floors show a very large variety of washstands, kitchen sinks, slop sinks, laundry tubs, etc., a special feature being the fine display of Haines, Jones & Cadbury Co.'s "Regal" solid porcelain ware, including many different designs in solid porcelain lavatories.

In the left hand division of the first floor is an extensive and varied line of water closets, with high and low tanks, shown in all the different kinds of woodwork. The closets and many of the other fixtures have water connection, so that their actual working qualities can be shown. The showing of bathroom trimmings, specialties and accessories is a most attractive one, as is also the display of solid porcelain drinking fountains.

The Western States

Office: 58-64 N. Jefferson St., Chicago. **Telephone: Monroe 816.**

ELMER CRAWFORD, General Manager. **Frank P. Keeney, Representative.**

TOWN'S OLDEST PLUMBER DEAD.

Bellefontaine, O., March 29.—J. T. Boyd, the oldest plumber of Bellefontaine, died suddenly while at work Wednesday from apoplexy.

OLD TIME CHICAGO PLUMBER BURNS OUT.

Thomas Conlin, an old time Chicago plumber, was one of the heaviest losers in the big fire on Cottage Grove Ave. on Monday, April 7, his shop at No. 3905 being entirely destroyed. Mr. Conlin's loss amounts to $3,000.

DID IT ALL WITH ONE HAND.

Oceola, Mich., March 11.—J. P. Lockwood has just finished a very neat job of plumbing. He has laid 120 feet of pipe from his pump to his house, underneath the cellar wall, through three floors and one side wall, put on nine elbows, and did it alone—rather an extraordinary job for a man with one hand.

PLUMBERS AND GAS FITTERS ON STRIKE.

Columbus, O., March 29.—The plumbers and gas fitters of this city to the number of 250 are on strike, owing to the disagreement between the unions to which the men belong and the Master Plumbers' association, in regard to a clause in an agreement which provides for the employment of apprentices to work with journeymen plumbers and steam fitters.

PLUMBERS ARE NOW OUT.

Cedar Rapids, Iowa, April 7.—Because the proprietors refused to grant the demands of the journeymen plumbers for eight hours' work on the former pay the laborers with pipes and hot solder walked out Wednesday afternoon and say they will remain out until their demands are met. Proprietors of the local concerns say they will make no effort to get them back on the proposed terms.

PLUMBERS WANT EIGHT-HOUR DAY.

Youngstown, Ohio, April 10.—Unless an eight-hour day is conceded at the present scale of wages the Journeymen Plumbers' Union will strike on May 1, resolution to that effect having been adopted by the local union, which has already sent an application to the national secretary, James McKee, of Pittsburg, to authorize a strike. Both journeymen and master plumbers are all organized and a hot contest is expected.

PLUMBERS' TROUBLE SETTLED.

Seattle, March 31.—The difficulties between the journeymen plumbers and their employers have been settled. The plumbers' union agrees under the terms of the settlement to withdraw from the Building Trades' Council. A condition of the settlement is that the men are to receive material concessions from their employers. One of these will be the increase in their wage scale from $4.50 to $5 a day, which they originally demanded and upon which they have insisted throughout.

GAS FITTERS UNION ABSORBED.

Cleveland, Ohio, April 1.—The Gas Fitters' Union has been absorbed by the Plumbers' Union. The gas fitters and the plumbers were members of the same division of labor and were governed by the same constitution, under the name of the United Association of Journeymen Plumbers, Gas Fitters and Steam Fitters, but each craft had its own union and worked separately. The reason for the amalgamation is that there are so few gas fitters that it does not pay them to sustain a separate organization.

ARE ALREADY PREPARING FOR NEXT YEAR'S CONVENTION.

South Bend, Ind., March 31.—The South Bend Master Plumbers' Association met one night last week in the H. P. Blair & Co. establishment and began work on the preliminary arrangements on the 1903 convention of the Indiana association, which will be held in this city. The entire local organization was converted into a committee of the whole to take the proper steps to make the convention next year the banner meeting and to demonstrate to the visitors South Bend's advantages as a convention city.

WELL-KNOWN PLUMBING FIRM DISSOLVED.

South Bend, Ind., April 8.—The partnership existing between H. P. Blair & Co., who conducted a plumbing and heating establishment on North Main St., has been dissolved by mutual consent. H. P. Blair retires from the firm. His former partner, David A. Westbury, will continue the business. The place will be known as the D. A. Westbury Plumbing and Heating Establishment. Mr. Blair has made no definite plans for the future. He has been quite ill of late and will take a much-needed rest. The firm has finished many big contracts throughout the country and enjoyed a wide reputation.

SPOKANE PLUMBERS ON STRIKE.

Spokane, Wash., April 3.—All the union plumbers in Spokane refused to go to work Tuesday morning, and as a result plumbing work in the city is practically suspended. The difference between the union and the master plumbers' association has attained the dignity of a strike.

Some weeks ago the union gave notice that it would demand a raise in wages from $4.50 to $5 a day, with a half-holiday Saturday without pay. The new scale was to apply on all contracts taken after April 1. This demand was acceded to, but the master plumbers laid down a new set of shop rules as an offset to their concession, and these rules have caused the trouble.

UNION PLUMBERS WIN.

Kansas City, Mo., March 29.—Only union plumbers can hereafter work for the city in the water works department. The board of public works have granted the demands of the plumbers' union and adopted the following resolution:

"Be it resolved by the board of public works, That all employes hereafter employed in the water works department for the inspection of water pipes and for setting and repairing water meters and all kinds of plumbing for the city water works, shall be practical plumbers, and that all applicants for such positions shall have a certificate from an authorized committee of the Plumbers' Union, composed of five members of said union, as to their qualifications.

PLUMBERS HAVE A GRIEVANCE.

Cleveland, Ohio, April 5.—A committee of the Master Plumbers' Association appeared before the board of directors of the Builders' Exchange yesterday to inform that body of the main points of the contention with the city over the water meters and the plumbing work incidental to their installation. The speakers were Leo Poplowski, W. J. Warden, L. Poplowski and J. B. Couture. The board decided that the exchange should support the plumbers in their efforts to have the work done by licensed plumbers, who should receive contracts for the work through competitive bidding, rather than allowing the work to be done by men not plumbers, who are employed by the city. A committee consisting of J. H. Libby, H. T. Williams and C. W. McCormick was appointed to wait on the mayor.

This committee, accompanied by President W. H. Hunt, called on Mayor Johnson at 1 o'clock yesterday afternoon and presented the matter to him. Mayor Johnson promised that he would consider the subject and submit his decision as soon as possible. He intimated, however, that he would not recede from his position in regard to setting the meters, although he allowed that the plumbers' demands were perhaps fair.

F. G. Hogan & Co. were elected to membership in the exchange. This company succeeds William Gilbert, one of the city's pioneer contractors, who has retired.

ARE ALL ON A STRIKE.

Marion, Ind., April 7.—The plumbers, carpenters, hodcarriers and bricklayers have not been working since last Tuesday, pending an adjustment of the differences existing between the employers and the employees. The bricklayers are not included in the settlement, but are idle because they cannot work without the hodcarriers.

The new scales presented have not as yet been signed and the employers state emphatically that they will not be unless changed in a number of their provisions. A number of meetings have been held, but as yet neither have given any indication of yielding.

The plumbers have a scale that is especially unsatisfactory to the bosses, and, judging by the appearances to-day, a long struggle has been inaugurated. The scale calls for $3.50 per day for eight hours to plumbers and steam fitters, an increase of 80 cents per day over the old scale. The gas fitters are to receive $2.50 per day, which is an increase of 50 cents on the day.

There are a number of other objectionable features to the new scale and the bosses say they will never sign such a scale. For instance, the new agreement states that but one member of a firm of boss plumbers will be permitted to use the tools and work as a journeyman, thus making idle the other members of the firm if more than one should belong. Another feature objected to is that if a man shows up of a morning to work and there is nothing to do, he must receive pay for half the day. There are a number of other technicalities that are serving to keep the employers and employees apart.

Milwaukee Items

BIG COVERING CONTRACT.

The largest contract for pipe covering ever let in this or any other country has just been awarded to the Johns-Manville Covering Co. of this city. The contract calls for two hundred and eighty odd miles of pipe covering and amounts to over $300,000. It will take 180 freight cars to transport it to California, where it is intended to cover an oil pipe line from Southern California North, and includes all covering required in twenty-eight stations. The oil is pumped into the pipe at a normal temperature and, to maintain this, the pipe is covered with a special covering made only by this company. Large asbestos paper mills are now in course of construction by this company; they have just completed a large mill for the manufacture of covering material and expect to increase their plant by the erection of a large warehouse and office quarters in the near future on the site of their present five-story building. In this connection the writer found material for a history of this business and its founder which will prove in-

teresting reading. It will show how pluck and perseverance can overcome every obstacle in a business that, from its outset, would have discouraged nine men out of every ten.

BAD FOR THE PLUMBERS.

The city election here leaves the city council without a plumber in it. W. F. Spaar, who was a member of the city council last season, was defeated. The master and journeymen plumbers' associations in all cities need a city father of their choice to prevent impositions. It is only reasonable that business-like plumbing and drain-laying, licensed by the city and under restrictions otherwise, as well as subservient to all the whims and mandates of heads of departments of the city, should be entitled to every reasonable protection. Much complaint has been heard because a considerable work that was formerly done by plumbers is now done by hardware employees and tin men; in fact, nearly all stove and heater connections are made by tinsmiths.

WANT NEW SCHEDULE.

The journeymen, through their conference committee, acting with a like committee from the masters' association, have sent in a new schedule of wages; also a demand for a Saturday half-holiday for four months, June, July, August and September. Wages under the new arrangement shall be $3.50 per day of eight hours for all men, except the so-called jobbers (a strange distinction), who shall be paid $2.25 per day of eight hours. Last season's experience has proved to the masters that there are no $2.25 men, but all demand the higher wages, regardless of merit, and the claim is made by the masters that this is one of the bad features of a uniform scale, what it practically amounts to, and should be regulated by the journeymen. The time is past in this city when the masters will keep the cheaper men. Every one is trying to get the best and yet, many times, must take all comers to fill in a gap.

GOODMAN'S LARGE CONTRACT.

The largest contract ever let here was awarded to William E. Goodman, and the Wells building, when completed, will be illuminated with electric fixtures of special design. The contract includes the glassware and globes. One of the pleasant things in the contract is that competition did not count and the price made by Mr. Goodman being considered fair, he was given the job. One of the largest flat buildings now nearing completion consists of thirty-five apartments, of an average of seven rooms each, and it also will be supplied with combination fixtures by Mr. Goodman. The boys here say that Goodman is waking up, but that is not so. He has been up and doing for many years, and few men attend closer to their business than William E. Goodman.

Minneapolis and St. Paul Notes.

By the Deacon.

BACK FROM CALIFORNIA.

Allan Block has returned to St. Paul from a short vacation trip to his Los Angeles home.

HANDSOME RESIDENCE TO BE BUILT.

A handsome new residence will be erected at once by Chas. Scherf on his property at 1311 Emerson avenue, North Minneapolis.

FLAT WORK WILL BE PUSHED.

Work on O. M. Evans' flat building at 1927 Ninth avenue, South Minneapolis, will be commenced soon and pushed to completion.

TO HAVE MODERN HOME.

Dr. A. E. Benjamin is building an $8,000 two-story frame residence at 2222 Blaisdell avenue, Minneapolis. Modern open and full nickel plumbing will be installed.

KEEPING BUSY.

Wm. S. Bayley, the genial Irish plumber, of Minneapolis, reports business quite good. Mr. Bayley is now completing a twelve-flat job and has several other good-sized contracts under way.

WILL HAVE MODERN PLUMBING.

Mr. Geo. Slater is building a frame residence at 633 Aurora avenue, St. Paul; cost, $3,850. Open plumbing and all modern improvements will be put in.

WILL MOVE MAY 1.

A. A. George, successor to the business of J. S. Kearney, located at 16 Third street, Minneapolis, will move May 1 into new quarters, the location of which has not been decided upon at this time.

WATCH OUT FOR THEM.

Frank Schuler, Frank Fleming and Billy Nary, all Minneapolis East Side plumbers, are learning to bowl ten pins and if they persist in practicing they soon will be able to make scores of 125 to 150.

LANDED THE CONTRACT.

Holt & Dahlby, of St. Paul, landed the heating contract for the Sisseton, S. D., courthouse; price, $3,000. The Fargo Plumbing and Heating Co. were next lowest bidders, being $180 over Holt & Dahlby's bid.

BUILDERS' EXCHANGE ASSURED.

An organization to be called the Builders' Exchange is now an assured thing for Minneapolis. The exchange will begin its life with about 150 members, and will aggressively promote the interests of its members. A secretary has not been elected, but will be soon. H. N. Leighton, president of the Master Builders' Association, is also president of the exchange.

Association News.

TO BE HELD IN ATLANTIC CITY.

There is a strong likelihood that the annual convention of the National Association of Master Steam and Hot Water Fitters will be held at Atlantic City, N. J., on June 11-12-13. Henry B. Gombers, national secretary, is now busily engaged looking after the final preparations with a view to the date mentioned. The time for holding the convention will probably be announced at an early date. The previous week may be selected by the National Association of Master Plumbers for holding their convention, and many plumbers and steam fitters will doubtless find it desirable to attend.

DATE OF NATIONAL CONVENTION DECIDED.

Word comes from national headquarters as we go to press that June 17, 18 and 19 are the dates decided upon by the executive committee of the National Association of Master Plumbers for the twentieth annual convention at Atlantic City, N. J. Headquarters will be at the new Rudolph Hotel, while the sessions of the convention will be held in the Auditorium on the steel pier. From the enthusiasm which has marked the various state conventions since the first of the year, it is safe to say that the national convention this year will be exceptionally well attended and of more than usual interest. It is to be hoped that every state and local association in the country will send a full delegation. Then the vote of the convention will be truly representative of the opinion held by master plumbers in all sections of the country on all important topics.

MR. KIRTLEY RESIGNS.

We are advised by President Hornbrook, of the National Association of Master Plumbers, that Geo. P. Kirtley, secretary of the National Association, has sold out his plumbing business, and tendered his resignation as secretary. Mr. Kirtley's resignation has been accepted by the executive committee, and Timothy Cotter of Kansas City, Mo., has been appointed by the executive committee to succeed Mr. Kirtley.

Association mail for Mr. Cotter should be sent to 1214A Main street, Kansas City, Mo.

Geo. W. White of Newport, Ky., has been appointed national state vice-president for Kentucky to succeed Thomas P. Watts, who having sold out his business in Kentucky and removed to Kansas City, tendered his resignation.

J. T. Sanders of Sioux Falls, South Dakota, has been appointed national state vice-president for South Dakota.

Letters from national headquarters these days have an enclosure in the shape of a neatly printed blotter designed to remind association members of the benefits to be derived from the Cleveland Resolution, which stand for the aboslute protection of members. This is one of several advertising novelties sent out by the national officers, and is very effective.

THE ALABAMA CONVENTION.

We are indebted to President Thos. J. Young, of the Alabama State Association of Master Plumbers, for the following notes on the convention held in Mobile the middle of February. Mr. Young apologizes for the tardiness of his report by explaining that he was compelled to undergo an operation a day or two after the convention. We are glad to say that he is now able to be around again.

The convention, Mr. Young says, was one of the largest and most enthusiastic gatherings of master plumbers ever seen in the state. Very few were absent and there was more enthusiasm and genuine good feeling manifested than ever before.

The abrogating of the New York conference resolutions and the adopting of the Cleveland resolutions by the national executive committee was heartily endorsed.

Alabama is now thoroughly organized. A delegation was sent to Montgomery to organize that city and the results were eight members, which included every master plumber in the city.

The visitors were splendidly entertained by the Mobile local association. Among the entertainments may be mentioned a carriage drive down the famous Bay Shell road, a lunch at Frederick's place (by the way, Frederick knows how to make a crab omelet), and a banquet at the Southern Hotel.

The following officers were elected:
President—Thos. J. Young (re-elected).
Vice-President—Chas. W. Ross.
Treasurer—J. W. Michael.
Secretary—Jno. R. Young (re-elected).

The state will be fully represented at the national convention to be held in Atlantic City in June.

The absence of Daniel A. Farrel was regretted. Dan has never been guilty of missing a state meeting before. Jim Blake was also conspicuous by his absence. Jim always has a kindly feeling for widows and children and makes them his especial care. (Refer to notes of delegates to Kansas City, who observed his actions in a wreck on the Memphis route returning home.)

Grandpa Copeland is a corker, and for a downright real enjoyable evening's entertainment Chas. Simmons and Capt. Madeson were declared winners. Wagner? Oh, no; he is not slow! At least some of the boys declare he is not.

After all the entertainment and business was over the Mobile masters saw the visitors off on their homeward journey and all declared that they had a most delightful time.

Dominion of Canada

Montreal Office: 301 St. James St. Tel. Main 2018. E. G. O'Connor, Representative
Toronto Office: Room 44, National Trust Co.'s Building, 20 King St. East.
Victor H. Ross, Representative.
Quebec Office: 96 St. Peter St. ELMER CRAWFORD, General Manager

Toronto

SPLENDID MEETING OF TRADE MEMBERS ON GOOD FRIDAY.

A gratifying advance in the organization of the trade in the Dominion was accomplished on Good Friday at the meeting held in Pythians' Hall. The presence of men of affairs from several distant points, men who could ill afford the time away from their public and private interests, showed the great hold that the efforts at the thorough organization of the trade had taken upon its most prominent members; and the self-sacrifice of those Toronto men who did much to promote the convention was well rewarded by the lively interest taken in the proceedings of the meeting. Notably was this true in the case of Messrs. William Mansell, J. H. Meredith, J. H. Wilson, and others. There was much valuable time given to preparations for the gathering, and the generous spirit shown by them in giving up so great a portion of their time was undoubtedly appreciated by the delegates.

Although the convention was not large, a sufficient representation from all portions of the province to place the organization upon a sound and sure footing was obtained, and it is scarcely a matter for regret that the trade throughout the country is so busy that many of its members found it absolutely impossible to leave home. The proceedings throughout were of so interesting a character, however, that it is safe to say that at the next meeting on Thanksgiving Day every town and village in the province will be represented.

The delegates met in the large hall used by the Toronto Association for business meetings, and were welcomed by members of the local body. Among those present at the afternoon session were the following delegates:

Barrie—T. H. Neelands.
Berlin—Philip Gies.
Brantford—Charles Taylor.
Guelph—H. Mahoney.
Hamilton—Andrew Rogers.
Peterboro—Robert G. Sturgeon, Clark, Walsh and Stewart.
Ottawa—John McKinley, H. A. Knox.
Smith's Falls—J. F. Reed.
St. Catharines—A. Chatfield, S. P. Gourly, H. Riddell.
St. Thomas—C. T. Bull and James Williams.
Toronto—William Mansell, H. B. Hogarth, George Clapperton, W. H. Meredith, George H. Copper, E. Larter, James Sherlock, R. Harrison, James Fitzsimons, W. G. D. Adams, Robert Ross and A. Purdy.

Mr. John McKinley, president of the National Association of Master Plumbers of Canada, formally opened the meeting and in a few words welcomed the visitors and expressed the conviction that the decision to form provincial associations had been a move in the right direction. He prophesied that the Ontario Association would be of great assistance not only to the trade in Ontario, but would be an example to the other provinces. A constitution and by-laws were then adopted, the secretary of the National Association, Mr. H. A. Knox, of Ottawa, rendering valuable assistance.

Mr. William Mansell, of Toronto, received by the unanimous vote of the delegates the office of president, the other officers being elected as follows:

Vice president, William Clarke, Hamilton; secretary, W. N. Meredith, Toronto; treasurer, J. H. Wilson, Toronto; executive committee—S. Gourly, St. Catharines; Philip Gies, Berlin, and H. Mahoney, Guelph. The chairmen of the committees were: Legislation—T. H. Neelands, Barrie; sanitary—A. Rogers, Hamilton; apprenticeship—Charles Taylor, Brantford; essay—R. Ross, Toronto.

It was decided to hold the next meeting of the association in Toronto on Thanksgiving Day.

A BUSY YONGE STREET FIRM.

Richard Brothers, the well-known plumbers and heaters of Yonge street, are at present working on the alterations of five houses on Jarvis street, one new house on Brock avenue, and four new houses on Marqueretta street. All the jobs have to be finished by the first of the next month.

GOT ST. MICHAEL'S CONTRACT.

W. J. McGuire & Co. have been awarded the contract for the plumbing and heating of the audition to St. Michael's College. This specification calls for Ideal low tank combinations, and the architect is Mr. Poste, of Buffalo.

MR. TAYLOR'S NEW BUSINESS.

Mr. John Taylor, who has recently resigned from the management of the Dominion Radiator Company, has purchased a controlling interest in the A. R. Woodyatt Company, of Guelph, Ontario. The company manufactures general hardware and makes a specialty of lawn mowers.

NEW CLUB FOR WEST END PLUMBERS.

The plumbers of the west end are forming a social club and have taken rooms on the corner of Spadina avenue and Cecil street. Mr. R. Robinson, of Bates & Robinson, plumbers, Spadina avenue, has been appointed president. The rooms will be opened this week. Already a good membership has been assured.

BATHROOMS FOR HUNT CLUB.

The work of putting in additional bathrooms to the Toronto Hunt Club, East Toronto, has been awarded to the firm of Fiddes & Hogarth, which firm also has the contract for the plumbing and gas fittting of a residence for Dr. Sheard on Jarvis street.

"IDEAL" DOCTOR'S HOUSE.

Mr. J. T. Aggett has the plumbing contract for house being erected by Dr. Caleb Evans on Bloor Street West, near Madison avenue.

This house is being built suitable to the requirements of a medical man. The plumbing is to be of the finest and the Ideal Company's "Sileo" low tank combinations are to be used throughout.

RECONSTRUCTING THE "MUSKOKA."

Messrs. Purdy Mansell & Co., who received the contract for the plumbing and heating of the Royal Muskoka Hotel, Muskoka, last summer, are about to start work on second wing and expect to finish about June 1. The Royal Muskoka is one of the finest summer resorts on the continent, and the plumbing and sanitary arrangements are of the best. Ideal low tank combinations as well as Ideal centrifugal traps are being used throughout the entire building.

Montreal.

BUSY BUILDING SEASON.

Mr. Aleide Chausse, Montreal's building inspector, reports that indications point to a very active building season. Twice as many building permits have been applied for up to date this season as at the same date last year. Not only do the permits exceed the number, but the amounts also are greatly in excess of last year. So apparent is it that the building inspector will have difficulty in keeping up with the work that an assistant to him would be at once appointed, if funds to pay his salary had been included in the annual appropriation. In the meantime some temporary assistance will be given Mr. Chausse.

PLUMBERS' UNION SUGGESTIONS.

The sub-committee of the Plumbers' and Steamfitters Union have had a satisfactory interview with the Civic Hygiene Committee. The sub-committee pointed out a number of errors in regard to specified sizes of pipes, etc., in the new city by-laws and the Hygiene Committee instructed the superintendent to make the changes.

The sub-committee also suggested that the sanitary inspector be classified into plumbing and nuisance inspectors, so that when instructions are given to improve the plumbing of any building the journeyman will receive intelligent orders.

They also suggested that all journeymen plumbers be required to pass an examination and that the Hygiene Committee open a small shop for the purpose. Both suggestions were promised favorable consideration.

MONTREAL'S MASTER PLUMBER ALDERMAN.

Joseph Lamarche, Montreal's master plumber alderman, is a representative and typical French Canadian. He put in his time with Mr. Frank Greene, who is now enjoying a Government appointment, and is in the prime of life, being well under 50 years. He is a fluent speaker in both French and English, a good debater and a natural born diplomat. His quickness to see a point

MR. JOSEPH LAMARCHE.

of weakness in an adversary's armor and his readiness in points of order soon brought him to the front in the deliberative proceedings of the council. He was first elected to the council in 1900 and his agressiveness there was the occasion of a deal set to defeat him at the elections which took place on February first. He was returned, however, by the narrow majority of seven votes. His

opponent asked for a judicial recount which only resulted in increasing his majority to ten. Now proceedings are being taken to upset his election on the grounds of corruption and insufficiency of his real estate qualifications. But he claims to have no fears of the result. He feels sure that if it had not been for the money used against him he would have had a majority of 100 and he says his property qualification is all right.

His friends describe him as a broad-minded, liberal man, a great reader of both French and English, an off-hand good fellow and a general favorite. He has always taken a great interest in athletics and stands high in the counsels of the amateur sportsmen of his nationality.

MASTER PLUMBERS LICENSED.

If you want to be a master plumber in Montreal now you have to pass an examination and take out a license for which you pay $5. Some of the old timers who have been doing business in the old way and do not seem to see that the car of progress is moving, object to this new idea and say that they are going to resist it even in the courts. Better thought will no doubt prevail amongst them as time goes on. Meantime the board holds regular sessions from 2 till 4 o'clock p. m. in the office of the sanitary engineer at the city hall on the third Monday of every month. The personnel is J. E. Dore, city sanitary engineer; Alcide Chausse, city building inspector, and J. W. Hughes, master plumber. The licensing of the journeymen plumber is under consideration and will no doubt soon be made effective.

Of General Interest.

KINGSTON MASTERS AND JOURNEYMEN AGREE.

There is but a few details to arrange before an agreement between the Kingston plumbers and their employes will be signed. The object is to have a definite understanding as to wage rates, length of hours, etc., so as not to handicap proprietors after they have made contracts.

CATALOGUE READY FOR DISTRIBUTION.

Ontario Lead & Wire Company, Ltd., with office and warehouse 54 and 56 Lombard street, Toronto, Ont., have just gotten their new catalogue "D" from the printer. And it is a book that will add to the reputation of both this well known company and the printers who brought it out for them. It is one of the most complete catalogues of Plumbers' Supplies ever issued in America, contains 350 pages, size, 9¼x12¼ inches, printed on best 100 lb. coated paper. The cover is of green cloth, stamped in gold. Their trade mark, which is known to everyone in the trade, is stamped in red on each page.

Their discount sheet is also ready, which covers the whole catalogue, and it is their intention to send change slips to their customers once a month, giving all changes in discounts, and prices that have taken place. They intend to make a special effort to keep discount sheet in their customers' hands complete so that it will do away with having to make out large quotations, and also put their customers in a position to quote their patrons immediately on receipt of inquiry, and will not, as in the past, have to wait, and write to the jobbing house before they can give their customer quotations.

Any one in trade entitled to this book and who may have been overlooked and not received it yet, will obtain one promptly by writing, mentioning DOMESTIC ENGINEERING.

THE JAMES MORRISON BRASS MANUFACTURING CO., LIMITED.

As a product of the present times, one that is more interesting to the people of to-day than ever before, is that of Sanitation and the appliances pertaining thereto, in addition to which might be added those requisites of a high-class order for use in connection with heating and lighting, steam, water and gas purposes. To those interested in the growth of the city of Toronto, it is a pleasing fact to know that the principal source for Canada from which these supplies are obtained is located in this Queen City of ours.

Steam engineering and sanitary science has advanced so rapidly of late years that manufacturers have been taxed to their utmost in producing goods of such a character as to be efficient and durable, neat in

design and effect. In this respect the well-known concern, The James Morrison Brass Mfg. Co., Limited, Toronto, can be said to take the lead, according to a booklet, entitled "Toronto, the Queen City."

Their reputation, obtained during some twenty-five years in the business, as the best and most reliable source for supplies in plumbing and steam requisites, is known by the trade throughout the Dominion. We may safely say that it is impossible to find an engineer, a plumber or anyone interested in these and the kindred trades, who is not familiar with the high-class products of this concern, and we might particularly mention those well known goods representing their J. M. T. series of brass specialties, which is a term now known by the trade as applying only to "The best in the land," and the best is none too good for those seeking durability in construction and elegance in design. Their illustrated catalogue, comprising upward of one thousand pages, presents to the trade in every city and town the vast variety of supplies, and all of the highest class of workmanship, that is obtainable from this house, such as: solid porcelain and porcelain-lined bath outfits complete, lavatory furnishings, in sets and in detail; latest water closet combinations—their renowned J. M. T. valves for steam, gas, water, oil, ammonia and pulp mills, steam gauges in variety, injectors, lubricators, steam whistles, and brass fittings of every description for plumbers', engineers', marine and locomotive use.

A recent addition to their already extensive lines is the manufacture of gas and electric chandeliers, in new and elegant designs, of a full variety and covered by their extensive catalogue illustrating these goods.

Notes d'Affaires Canadienne

ACHEVEMENT DES TRAVAUX DE PLOMBERIE.

MM. Ballantyne & Co., maîtres plombiers de Montréal, mettent la permière main aux travaux de plomberie dans la nouvelle annexe des Câtianent de la Royal Insurance Co. C'est une excellente et magnifique pièce de travail et qui fait honneur à l'nabileté de Ballantyne. L'installation des cabinets d'aisance est faite avec le Diamond syphon flush de la Robert Mitchell Co., avec ajustement du jet a syphon autometre de la méine compagnie. Ce dernier se trouve également dans les urinoirs. Les cabinets d'aisance et les urinoirs sont plagués de porcelaine dure et les bassins sont en fonte emaillée. Les parquets des lavabos sont en tuiles blanches et grisâtres d'environ sept pieds, revêtues de marbre Italien poli, tous outrages provenent de M. Robert Reid, de la Rue Ste. Catherine. Les emfyp d'ajustage sont en cerisier.

QUELQUES SPECIALITES DE LA COMPAGNIE ROBERT MITCHELL.

La Compagnie Robert Mitchell, si bien connue par les differentes Maisons de Plomberie, pour ses diverses patentes y compris gazeliers, robinets, accessoirs d'éclairage, vient de mettre sur le marché une combinaison de robinets, laquelle sera probablement familière à nos lecteurs. Cette combinaison de robinets, laquelle sera probablement facturiers qu'ils pensent qu'elle est sans son pareil. Elle est en service au Gourvernement Canadien, et dans toutes les batisses municipales du Canada. D'autres combinaisons irréprochables de leur manufacture sont: La "Tugela" Nos. 1, 2, et 3, le syphon à laver les reservoirs et le reservoir "Diamond." Cette compagnie fabrique aussi la fameuse patente à pression pour l'eau "Westmount" par la quelle les canaux et boulloires sont sauvés de beaucoup d'usure. Elle peut réquire sa pression jusqu'a 15 lbs. Elle est tout en cuivre et peut s'ajuster très simplement. Cette patente est de beaucoup préférable à tout autre regulateur et est employée surtout dans les grandes batisses.

Toute personne interessée, desirant obtenir de l'information, serra favorisseé d'une attention toute particulière et veuillez an écrivant mentioner le DOMESTIC ENGINEERING.

LA FOURNAISE A EAU CHAUDE "STAR."

La Compagnie Star Iron, limitée, située au No. 593 rue Craig, Montreal, entrepreneur de plomberie, appelle l'attention de ses clients envers la fournaise a "Eau chaude" laquelle nous avons le plaisir d'illustrer. Cette fournaise d'après ses manufacturiers, est très bien perfectionnée avec ses bouilloires et son gril. Le syphon injecteur est un point très important en sa faveur, quand le feu chauffe a son niveau. Par l'aide de se syphon injecteur, la circulation dans les tuyaux de dessous est aug-

mentée par la vitesse de la circulation dans les tuyaux de dessus. C'est une invention perfetionée qui donne grande satisfaction. Le sas breveté dans le bas de cette boulloire previent les cendres de se repandre sur le plancher et de salir les sections. La même poignée secoue le gril et sase les cendres en meme temps avec les portes fermées et il est si simple qu'un enfant peut la manier. Le gril est construit defacon à allouer assez d'air assurant, parlà une combustion parfaite et complète de charbon.

Il agit aussi en même temps sur toutes les parties du feu, ramenant les cendres aussi bien du centre que de chaque coté du gril. Les fournaises "Star" a eau chaude sont, en somme, des bonnes fournaises qui sint certaines de rencontrer toutes les appropriations qu'on leur fait.

Les catalogues seront envoyés promptrement sur demande. Veuillez mentioner le journal DOMESTIC ENGINEERING quand erez le catalogue.

GEM HOT WATER AND STEAM BOILER.

Abendroth Brothers, of Port Chester, N. Y., with stores at 109-111 Beekman street, New York City, and at 114 High street, Boston, Mass., are informing the trade about the Gem hot water and steam boilers. These boilers are easily and quickly set up and their capacity is guaranteed. This firm are also manufacturers of the Abendroth vertical sectional steam and water boilers so long and favorably known to the trade everywhere. Crane Co. are agents for these very desirable boilers at Philadelphia, Pa., and Western Valve Co. at Chicago, Ill. Interested parties who write to Abendroth Bros., Port Chester, N. Y., and mention DOMESTIC ENGINEERING will be pleasantly surprised by receiving a very neat illustrated catalogue containing much valuable information about steam and hot water boilers.

DALTON-INGERSOLL CO.'S NEW CATALOGUE.

The Dalton-Ingersoll Company, of 171-175 High street and 55-59 Purchase street, Boston, Mass., the well known jobbers of plumbing supplies and manufacturers of sanitary specialties and general plumbing goods, have just favored us with a copy of their latest catalogue evidently fresh from the press. This is an exceedingly neat and handy volume, so perfect in every respect that even if we tried ever so hard to criticise it we could find nothing to say but praise in its favor. The book is bound in flexible black leather and printed on an extra fine quality of paper, almost as fine as Indian paper, making it very handy and convenient for reference because it has reduced a large book to the size of a text book. It contains 444 pages with numerous illustrations of their exceedingly large line of high grade supplies and tools, plumbers' and sanitary specialties, with complete descriptions. It is the handiest and nicest book of its kind we have happened to run across for some time, and to say that it speaks well for this old and well established house is putting it altogether too mildly. No plumber in any part of the country ought to be without it, and the business-like way in which everything is arranged in it will, we predict, be a source of constant delight to the plumber who is fortunate enough to patronize them and get into possession of it. Every New England plumber should write for the book and he will at once be convinced that they have facilities for rendering prompt and reliable service, supplying him with strictly up-to-date supplies. If you do write, it will help you to mention DOMESTIC ENGINEERING.

A RELIABLE MERCANTILE AGENCY.

The National Mercantile Agency has appointed its cabinet from among the commercial and industrial leaders and entered upon another era which cannot fail to be one of great and ever-advancing prosperity. The officers are such men as Gen. Benjamin F. Tracy, ex-secretary of the navy; Marshall S. Driggs, president of Winsburg City Fire Insurance Co.; John G. Jenkins, president of the First National Bank, Brooklyn Borough, New York City; Thomas F. Goodrich, vice-president of the National Surety Co., New York, and the Chicago manager is Prentice R. Goodrich, with offices in the New York Life building.

The agency lately elected as president Cornelius Van Cott, postmaster at New York City, and also increased its capital from $500,000 to $1,000,000.

Subscribers obtain from this agency on lease the "Blue Book" of credits. This is corrected and issued annually. This book is a combination of Ealy's Blue Book of Credits, which has been issued for twenty-five years, and the list issued by the Bankers' Commercial League. These puublications, noted for their excellence, will preserve their good features undiminished. The agency is progressive in principle, and any changes that will be made will be in the direction of improvement.

The ratings given in this agency's book are the result of careful investigation and the subscriber can be reasonably sure of their accuracy. The agency has splendid facilities for making collections and obtaining reports, as it has attorneys and correspondents in all parts of the world. Subscribers have the privilege of a certain number of reports on each subscription, and extra reports at a moderate charge per year.

Collections instrusted by subscribers to attorneys having contracts with this company are protected by bond of the National Surety Co., New York. This agency is a great help to business men, both in furnishing required information and making collections. It has thus saved many an otherwise sound business from much loss and even ruin. A subscription with such an agency is one of the best investments a business man can make.

MORGAN'S VACUUM SYSTEM.

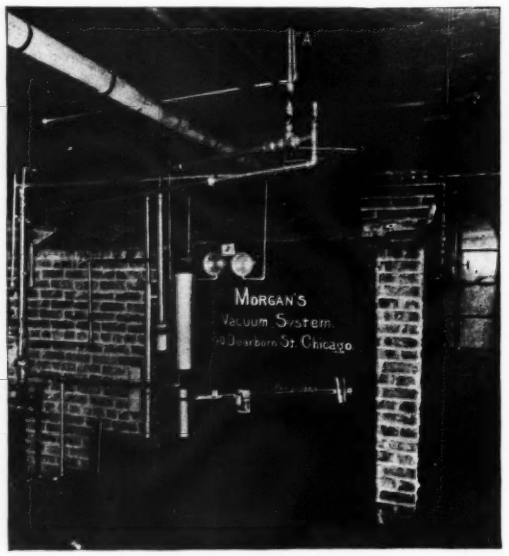
A sizeable vacuum system has been installed by Morgan & Co., Chicago, in a South Chicago apartment building. The building, which is shown herewith, has a frontage of fifty feet and a depth of about one hundred feet. It is five stories high and contains eleven flats, besides the apartments occupied by the owner, which in space are the equivalent of three flats. There are two flats in front of the first story, boiler room and laundry, occupying the space of one flat in the rear. The building contains seventy-one radiators and five coils, about twenty-five hundred feet (square) of surface, in addition to mains and risers, which are not covered. There is also connected to the heating boiler a three hundred gallon tank from which is furnished hot water for domestic purposes.

FLAT BUILDING HEATED WITH MORGAN'S VACUUM SYSTEM.

The building was first fired on December 7th, last, but as it was in an incomplete state we can not make a fair comparison as to the relative economy of the apparatus with and without the vacuum system, though relative attention required and duration of heat may be fairly compared.

The boiler is a multitubular with smoke-burning attachment and as a smoke burner is very successful; smoke burning attachment consists of cooking ovens, one on each side of center grate, grate of ovens having sharp pitch towards center grate, the fuel after coking being raked onto center grate. Gases from coking coal pass to back of boiler in brick flues and are returned to front,

passing up through center grate, also through incandescent coals thereon and are practically consumed, there being very little if any smoke showing at top of chimney. Fuel used is Illinois soft coal, run of mine grade.



MORGAN'S VACUUM SYSTEM.

Before atatchment of the vacuum system it was necessary to fire the boiler every two hours from 5:30 a. m. until 9:30 p. m., heat being maintained not to exceed one-fourth of the time during these hours and not at all at night. Under these conditions there was consumed during the month from December 7th to January 7th thirty-four tons of coal. The vacuum system was attached on January 9th and, though not entirely completed, was immediately successful in maintaining constant heat both day and night, the consumption of fuel for the ensuing month until February 9th being twenty-seven tons. The fuel consumption from February 9th shows a very marked decrease, though the amount can not be determined before the entire carload of coal has been used (all above weights being taken from the bills of the coal dealer).

Mr. Morgan, of Morgan & Co., Chicago, in speaking of the job to a representative of DOMESTIC ENGINEERING, said: "We have proven to our entire satisfaction that with vacuum system heating the amount of fuel used is governed by the external temperature and, further, that the attention required is correspondingly reduced, as in this plant. In the most severe weather it was only necessary to fire five times a day in addition to raking the coke onto the center grate twice, whereas, before the vacuum system was attached, nine times was the minimum, and it is our belief that with the ordinary steam boiler using hard coal firing once in twenty-four hours would be sufficient.

"In this apparatus (with the exception of one cluster of four radiators) each radiator has a separate air pipe extending to basement, where it is attached to the main air pipe, which is one inch, running side by side with the main. The one-inch pipe starts at the end of the return pipe, which is connected to the main air pipe through a mercury trap, this being the high end of the air pipe, which from this point pitches to the boiler. At the boiler the air and water of condensation are separated by a loop, the air passing up and over the loop and thence down to the main mercury trap, the water passing to the boiler through the return. In this manner all escape of water or steam into boiler room is entirely overcome. The damper regulator is attached to return pipe below water line so that circulation takes place through coil in tank, in this way governing the action of the regulator by the temperature of the water in the boiler.

"We find in practice that it is unnecessary to run a separate air line from each radiator—in fact, as many radiators can be connected to one pipe as is convenient. We also find that while an absolutely tight job

Wallace L. Pierce, Pres.
Geo. B. Little, Vice-Pres.

Osborn B. Hall
Gen'l. Manager Mechanical Dept.

Geo. T. Coppins, Sec'y.
Geo. H. Graves, Treas.

Walworth Manufacturig Co.

Tools and Supplies

FOR STEAM, WATER AND GAS USERS

Established
1842

Incorporated
1872

128 to 136 Federal Street
Boston, Mass., U. S. A.

New York Office, Park Row Bldg.
Factory, South Boston

will give the best results, a job that has many perceptible leaks will be greatly benefited by the vacuum system. A steam plant as tight as a hot water plant will yield, with the vacuum system, the same temperatures and with very much less fuel than the hot water plant, the expense of construction being materially less."

AN ATTRACTIVE CATALOGUE.

An attractive catalogue has reached the trade from the Vapor Heating Company, of York, Pa., which tells all about the Broomell patent vapor system for the heating of buildings with steam. This system has been installed in many large and prominent business buildings and residences which are shown by handsome half-tone engravings in the catalogue. This company claim that their system has all the advantages of hot water heating without any pressure in the radiator; that it is noiseless; has no air valves; that each radiator can be wholly or partly heated; that the system is adapted for use with any good boiler and that by using smaller piping than is generally used for heating the first cost is reduced. The catalogue also shows several views of the company's special valve and illustrates in a general way how easily the entire system can be operated. Then follows a pleasing treatise of steam heating which leads up to the Broomell patent vapor system, which is so explicitly explained that its features and operation can be readily comprehended. The final pages illustrate different methods of piping and directions are given for installing a complete working system. Any assistance that the steam fitters may require to enable them to install the system will be cheerfully given by the above company.

W. D. Robinson, Spring Lake, N. J., is installing some of Cooper's goods in a cottage near that place.—Adv.

HOW ACHESON GRAPHITE IS MADE.

In view of the growing use and popularity of graphite in the trade, especially as a form of cement for threaded joints, the editor of DOMESTIC ENGINEERING is sure that our readers will read with interest the following extract from the answer to a letter of inquiry recently addressed to C. J. Collins, second secretary and treasurer of the International Acheson Graphite Company, of Niagara Falls, N. Y., regarding their peculiar method of producing graphite from coal and coke by means of the electric furnace. Mr. Collins says in part:

Acheson graphite is, as you are probably aware, manufactured by treating in an electric furnace various forms of amorphous carbon as raw material, such as anthracite coal and petroleum coke. By such treatment the amorphous carbon of the raw material is converted into graphite and the impurities originally contained therein are volatilized and driven off like so much moisture or vapor at the high temperature obtained. Its purity is in fact merely a question of the amount of energy expended in the furnace in driving off the impurities of the original raw material.

Acheson graphite is not an artificial imitation of or substitute for the natural graphites, but is identical with these latter in both their physical and chemical characteristics.

Its method of manufacture is probably a duplication, on a small scale, of the process by which the natural graphites were themselves formed in the earth. On account of its method of manufacture we can guarantee the purity, uniformity, and other superior characteristics of Acheson graphite.

Although a new product of the electric furnace it is already meeting with very great success in a number of different lines of manufacture for which the natural graphites have heretofore been used. For use as a pigment for protective coatings upon structural iron and steel its success can be attributed to its great purity, uniformity and inert quality. Acheson graphite is absolutely unaffective by any acids or alkalis gases of combustion, sulphurous vapors, moisture or other elements, always present in the atmosphere, and whose action is of the most destructive nature.

For use as foundry facings its purity is again of value, as in consequence of this quality there is absolutely no slagging with the molten metal when it is poured into the mold. Its high temperature of oxidation in this line of work furnishes an additional advantage.

In the plumbing trade, red lead and oil have heretofore been used, almost universally, as a form of cement to be used in threaded joints. Red lead is a form of oxide, and not only causes oxidation and hardening of the oil with which it is used, but also causes serious oxidation and rusting of the joint upon which it is applied. For this reason it is almost impossible to take apart systems of pipe in which this form of cement has been used. Recent experiments with Acheson graphite for this purpose prove it very efficient and satisfactory. A mixture of graphite and grease makes an absolutely tight joint in a pipe. On account of its purity there is absolutely no oxidation or harmful action either upon the grease or with the iron of the pipe itself, and such a joint can be taken apart at any time with the greatest ease. Graphite furthermore, having decided lubricating qualities, is an ideal substance for such purposes.

Very truly yours,
C. L. COLLINS.

Hudner & Gegelsberger, St. Paul, Minn., have some work on hand in which they are using Cooper's closets.—Adv.

MANY ORDERS BOOKED.

The H. W. Johns-Manville Co. have secured a number of contracts for the installation of their materials recently, among which are the following:

The Hygeia Refrigerating Co., Elmira, N. Y., where a complete line of insulation with Fire Felt Covering is being installed.

The modern up-to-date hospital maintained by Messrs. Arnot-Ogden is being fitted up with Asbesto-Sponge Moulded Covering.

The Lestershire Mfg. Co., Endicott, N. Y., which will be the largest tannery in New York State when completed, is being installed with H. W. Johns-Manville Co.'s Asbestocel Coverings.

Endicott, N. Y., is situated about nine miles from Binghamton, and during the past month arrangements for the erection of 350 homes and two other large factories have been completed.

The St. Louis Branch of the company report an order for the Wm. J. Lemp Brewing Co., of St. Louis, whose entire boiler plant is being remodeled and the new boilers will be covered with Asbesto-Sponge Felt. A special feature of the work at the J. Lemp Brewery will be the Asbesto-Sponge Fittings which will be of a sectional nature and the entire work will cost in the neighborhood of $3,000.

This branch of the company now has under way the covering of the pipes in the power house of the St. Louis Transit Co., 2d and Salisbury streets, the covering used being Asbesto-Sponge Felt also. The last order received from the St. Louis Transit Co., was for the application of Asbesto-Sponge Felt in the power house at Park and Vanderventer avenues. The total cost of these two power plants will be close on to $30,000.

The New Orleans Branch of the company report having received a contract from the Tenn. C. I. & R. R. Co. for covering steam pipes in connection with their rail mill plant at Ensley, Ala., of which the main steam pipe is 24 inches in diameter 354 feet long, 120 feet by 20 inches, 120 feet by 8 inches, 1,060 feet by 6 inches, 60 feet by 5 inches, 650 feet by 4 inches, 141 feet by 3 inches, 141 feet by 2½ inches, 36 feet by 2 inches, together with fittings.

This branch also secured a contract from Armour Co., for covering brine, steam, exhaust and hot water pipes from ten inches to one inch. They are now working on contracts for T. & P. Railroad Co., Grain Elevator Westwego for covering five Scotch boilers with 1½ inches moulded blocks, ½ inch cement and canvas.

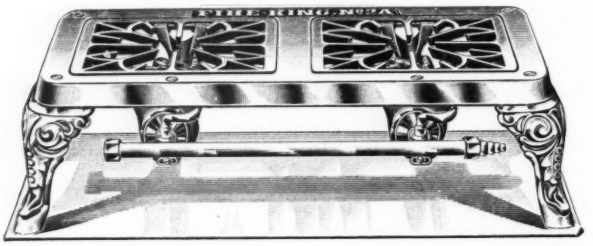
GRAPHITE LUBRICATION.

In the up-to-date machine shop, factory, power plant, and in the great railway systems of the world the question of proper and thorough lubrication is demanding and receiving far more attention than it did a few years ago. Insufficient lubrication is now known to mean not only annoying delays, wear, and loss of power, but less economy and a loss of money which present sharp competition cannot stand. Sperm oil was once considered the standard as a lubricant. In Europe it is still largely used and quite generally preferred, although in the United States it has given place to petroleum products. At the present time there seems to be no oil lubricant that can be called a standard, and in truth there cannot be any standard for the reason that lubricating oils must be selected for the work to be performed. An oil lubricant by filling up the inequalities of the bearing surface with its globules, lifts the opposing surfaces above the irregularities and forms a new surface, consisting practically of an innumerable series of microscopic but perfect "ball bearings." The disadvantages of oil lubrication are, that in order to lift the microscopic irregularities of the bearing up so that they will not rub and wear against the microscopic irregularities of the journal, there must be maintained between the rubbing parts a layer of oil sufficient to prevent direct contact between the surfaces; and to maintain such a layer, the material must be proportionately consistent. Now the greater the consistency or viscosity of an oil, the quicker will be the layer between the rubbing parts; but, as it has been demonstrated by all experts, in order to obtain the best results, the oil should be as fluid as possible. In other words, experts in oil lubrication acknowledge that there is a loss in lubricating power if the oil is thick and there is loss in strength if the oil is thin.

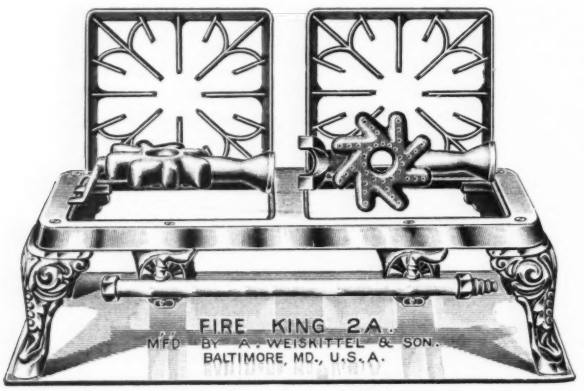
The escape from the limitations of oil lubrication is found in the proper use of a properly prepared flake graphite. The Joseph Dixon Crucible Company, of Jersey City, N. J., is one of the largest and most progressive companies of its kind in the world. Their factories cover fully two or more squares of buildings six stories high and they are still on the build. They are about to construct three large buildings each 100x100 feet and are installing extra extension electric motor power plants so they can try and keep up with the large demand for their goods from all over the country, which simply shows that there is a demand for first-class goods and the kind that can be relied upon, and the trade now seem to know where to get it, from a pencil to a crucible pot, that has the pure graphite in it, and they manufacture most everything that graphite can be used in to advantage and there is a demand for. The careful and thorough experiments in the testing rooms of experts, and the practical demonstrations of locomotive engineers, show that where properly prepared graphite is used, marvelous results in better lubrication are obtained.

The Latest in Fire King Gas Stoves.

The old and well known manufacturing firm, A. Weiskittel & Sons, of Alice Anna, Washington and Fountain streets, Baltimore, Md., whose specialties are fine stoves, ranges, fire place heaters, porcelain enameled bathtubs, lavatories, etc., have just added a new production to their already large line of Fire King gas stoves. This new addition which is herewith illustrated is quite an innovation in this line. It will be observed that the top gratings on these stoves hinge back and burners lift out for cleaning. The



burners are of the latest improved drilled type and cast in one piece, avoiding all leaky joints, which have been so objectionable on gas burners. These stoves are beautifully finished in nickel flush tops, edges and feet highly polished, making a smooth



surface easily cleaned. They are made in 1, 2 and 3 burner sizes and the manufacturers are ready to fill orders promptly. Complete information with prices of this and their other Fire King stoves can be had on application, mentioning Domestic Engineering.

E. Bevan & Co., Philadelphia, are plumbing a residence on South 16th street, using Cooper's closets, baths, lavatories and other fixtures.—Adv.

Raymond Lead Co.'s Reliable Ferrules.

The old well known and reliable Raymond Lead Company, of Chicago, whose well established reputation is due to the fact that nothing but high grade and reliable articles ever leaves their establishment, are informing those in the trade who do not know it by experience that their combination ferrules make reliable connections between lead and iron pipes, because they have an extra thickness of lead over the shoulder, giving strength where it is needed, and where other lead ferrules are weak. When ordering anything in their line from your jobber specify Raymond's and you will be sure to get the best. If you would prefer to have complete information, the Raymond Lead Company will send you same promptly on request, mentioning Domestic Engineering.

Benedict Nickel Seamless Tubing for Exposed Plumbing.

The wide use of high class exposed plumbing is creating a large demand for Benedict nickel because it preserves the elegant appearance of the plumbing, as it is white metal clear through and cannot, therefore be rubbed brassy. It saves labor and there is the assurance that it will never wear unsightly and have to be torn out and be replaced. It presents a perpetually brilliant silvery surface that can never be worn, nor rubbed, nor scraped away.

Its color lasts as long as the tube itself lasts. It is the same white metal clear through to the inside of the tube. Benedict nickel seamless tubing may be used in combination with plated faucets, which can readily be taken off and replated. It is made in all the regular iron pipe sizes or can be furnished in any special size desired. Other desirable qualities found in the Benedict nickel are that it has 50 per cent greater tensile strength than brass, actual hydraulic tests show 50 per cent greater internal pressure is required to burst Benedict nickel tubing than is required to burst brass or copper tubing. Tubing made of Benedict nickel is not liable to crack, as it is not readily affected by extremes of heat and cold, and is free from all imperfections liable to produce fracture. It will not readily break in coiling or bending, as it is extremely tough and tenacious in its nature.

The manufacturers of this very desirable metal are Benedict & Burnham Mfg. Co., of Waterbury, Conn., with offices at 253 Broadway, New York, and 172 High street, Boston, Mass. and they will be glad to send a book containing full information about this metal to interested parties who ask for it and mention Domestic Engineering. They are by the way also able to supply couplings, ells, tees, etc., in the same metal.

Joseph E. Hubeley, Philadelphia, has a contract for plumbing a Spruce street residence in which several of Cooper's Nautilus closet, baths, solid porcelain lavatories are being used.—Adv.

The Doorenbos Gas Arc Lamp.

The gas arc lamp seems to have come to stay. It is working a revolution in the lighting industry. It produces a gas light of as great a candle power as the electric arc at very much less cost. Gas companies are not slow to avail themselves of this means of holding their own with the electric lighting companies, and they are in many cities putting up these lamps on either a rental basis, or selling them outright.

The Sanitary Specialty Mfg. Co., 55 to 59 N. Clinton street, Chicago, claim that their Doorenbos gas arc lamp, illustrated herewith, is standing the test of time better than any of the other makes. They claim that the Doorenbos is a perfect lamp in every respect. If the volume of business they are doing with it is any indication, there are a great many people in the country who agree with them.

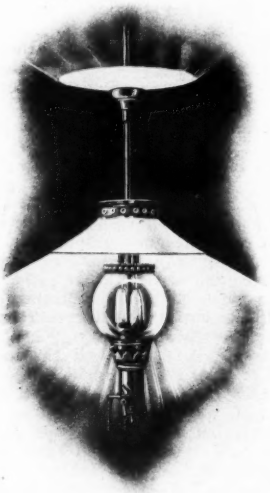
They are sending out a neat little folder of testimonials about the "Doorenbos" from which we extract the following:

"After testing two of your Doorenbos lamps, side by side with others, I am convinced that the Doorenbos will give as much light as the others with a consumption of about one-half as much gas. I have five of them in and am well satisfied with my investment."

"I have been trying for several years to obtain satisfactory light in my restaurant, but failure was the result in every instance until permission was given you to install a Doorenbos lamp on trial. On account of the vibration from printing presses on the floor above, I did not think it would be possible to use a mantel lamp. With your suspension device the mantels do not appear to receive any injury whatever from the vibration. I now have four Doorenbos lamps and can make my room as light as day."

"The Doorenbos gas arc lamp is satisfactory in every respect. The volume of light is even greater than I expected."

"The lamps are giving perfect satisfaction."



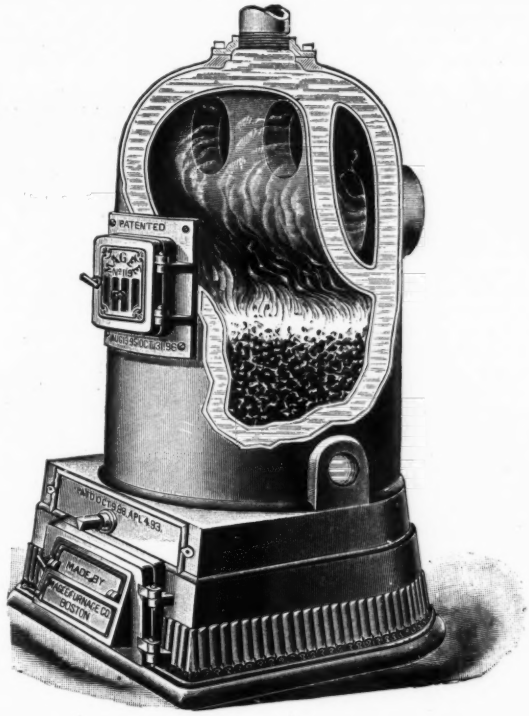
(We can O. K. the above sentiment for we have one of these lamps in our composing room and one in our office, and we are very much pleased with them.—Ed.)

Frank Walsh, Atlantic City, N. J., has the contract for plumbing the residence of Mr. H. M. Sypherd, using three of Cooper's closets, also a number of Cooper's lavatories, baths, kitchen and laundry fixtures.—Adv.

THE MAGEE STEAM AND WATER HEATER.

The accompanying illustration gives a sectional view of a Magee steam and hot water heater, which is made by the Magee Furnace Company, of 32-38 Union street, Boston, Mass. This heater has direct fire surface, which as compared with flue surface is as six to one, according to their claims. People who use Magee heaters have found out that their ratings are safe propositions. These heaters are made in seven sizes for steam or water—15 to 22 and 25 in construction, for direct pressure or tank, and every one is tested before leaving the foundry and fully guaranteed.

This company is well known as founders and manufacturers of brass, bronze and aluminum goods, hydraulic water lifts, beer pumps, plumbing, water and gas supplies; and when in need of anything in these lines it will no doubt pay you to write them for full information and prices before buying, and they will be glad to accommodate you, if you mention DOMESTIC ENGINEERING.

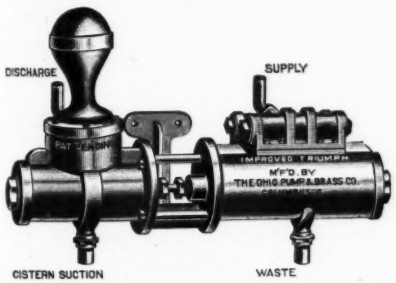


to 31. The Magee Furnace Company make the largest line under one name in this country of steam and hot water heaters, combination warm air and hot water, furnaces, ranges, stoves, etc., and they are always glad to send complete information of any or all their heaters to interested parties who write for it and mention DOMESTIC ENGINEERING.

Peter Forve, Wilkes Barre, Pa., is installing Cooper's Nautilus closet in a residence in that city.—Adv.

THE TRIUMPH WATER LIFT.

The Triumph Water Lift herewith illustrated is one of the many high-grade articles made by the Ohio Pump and Brass Company, of Oak and Enghteenth streets,

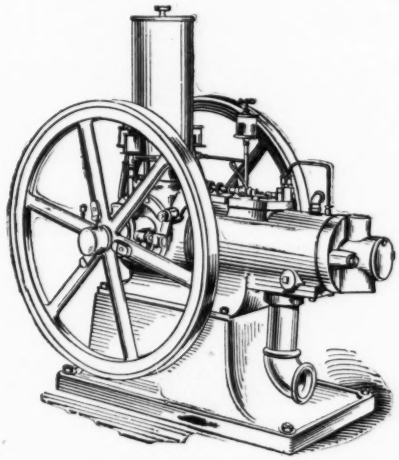


Columbus, Ohio. Several improvements of the kind that really improve have been incorporated in this water lift so that it is now an unusually effective and reliable apparatus. It is economical, durable, simple

G. Wilbur Thompson, Newton Centre, Mass., is plumbing the Barker residence, using Cooper's closet, baths and lavatories.—Adv.

THE MIETZ & WEISS KEROSENE ENGINE.

We are glad of an opportunity to illustrate herewith the Mietz & Weiss kerosene



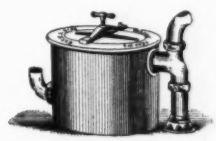
engine, which is made by August Mietz, of 128-138 Mott street and 87-89 Elizabeth street, New York City, so well known for his large and excellent line of gas and kerosene engines. The cut conveys a fair idea of the general design of the Mietz & Weiss kerosene engine. This engine receives at full power an impulse at each turn of the crank shaft, i. e. the air and fuel injection. The compression and burning of the mixture, and the expulsion of the exhaust are all performed at a single turn in the most direct and simplest method conceivable. The inclosure of the crank shaft, excluding dust and dirt, the absence of cams, valves and side shafts does away with all danger to inexperienced attendants. Other good qualities of this design, which cannot well be overestimated, are rigidity of the crank shaft bearings, perfect lubrication, cleanliness, no throwing of oil by the crank, elimination of danger from exposed crank shafts, silent and smooth running, prevention of smell caused by the slightest leakage past the piston, which is often noticeable in open cylinder engines by a disagreeable odor; this is entirely and permanently overcome in this engine by passing a charge of pure air through the crank chamber at every revolution. The ignition being effected by compression is entirely automatic in this engine. Provision is made for a kerosene blue burner, furnished with each engine, to be used for a few minutes before starting. No slide-valve, no electric, no tube igniter is used, which is a very desirable feature, especially appreciated by woodworkers and others on account of the inflammable nature of their products. A thorough and intelligent investigation will, the makers claim, convince the purchaser of the superiority of his engines, which are of good design, high class workmanship and built of the best material obtainable. All parts are easily accessible and readily renewed if necessary. The Mietz & Weiss engines are tested to the standard brake or actual horse power before they leave the iron foundry and machine works where they are made, and they are guaranteed to do all that is claimed for them. These engines were awarded silver medal at the Paris Exposition, 1900, and gold medal at the Pan-American Exposition, 1901. Catalogue with many illustrations and complete descriptions and also numerous testimonials will be sent to interested parties who write and mention DOMESTIC ENGINEERING.

For the benefit of our readers in the New England states, it may not be amiss to mention that W. L. Blake & Co., of 79-85 Commercial street, have the agency for these excellent engines.

George F. Uber & Co., Philadelphia, have the contract for the Colonial Trust Co. building in Reading, Pa., in which they will use over one hundred of Cooper's best fixtures.—Adv.

THE EXCELSIOR GREASE TRAP.

Sproul & McGurrin of Grand Rapids, Mich., well and favorably known both as plumbers and as manufacturers of the Excelsior grease trap, herewith illustrated,

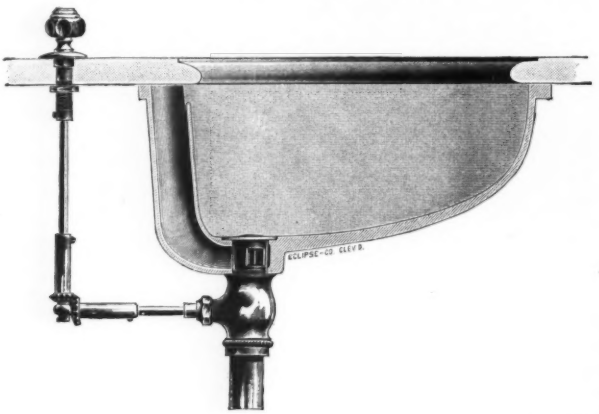


are informing the trade that this excellent fixture is made in two sizes for hotels and restaurants and for residences. They will be glad to send complete information and price list to readers of DOMESTIC ENGINEERING who ask for it.

The Foot & Shear Co., Scranton, Pa., are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closet.—Adv.

THE NEW EXCELSIOR WASTE AND BASIN.

The new Excelsior waste and basin, of which a sectional view is shown herewith, is a fixture recently put on the market by the manufacturers, the Sanitary Company, of Cleveland, Ohio, who hold the opinion that it is the most sanitary combination on the market. It cannot get out of order, as will be readily seen from the illustration, and they claim it to be the only basin that can be cleaned without removing a brass strainer. The basin has no strainer, still only the dirty water can pass into the overflow, which is made in such a manner as

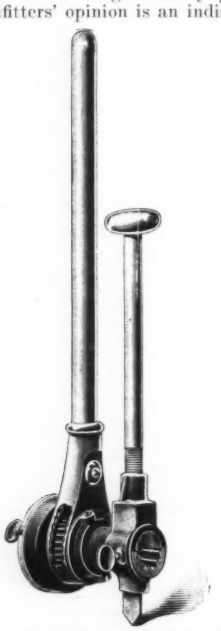


to make it easily accessible. Their new catalogue E tells all about this and many of their other desirable fixtures, and they will be glad to send it on request if you mention that DOMESTIC ENGINEERING gave you the tip.

Geo. W. Saaler, Denver, Colo., is installing four of Cooper's closets in a residence in that city.—Adv.

THE CLIMAX RATCHET STOCK.

C. M. Kemp Mfg. Co., of Baltimore, Md., are the successful manufacturers of the Climax ratchet stock herewith illustrated, which in their and a good many plumbers' and steamfitters' opinion is an indispensable



tool for conveniently threading iron pipe in ditches, under floors, in corners, overhead, etc. With this tool threads can be cut without removing whole lengths of pipe; it is provided with a strong vise which securely grips the pipe, and by means of the leading thread the die is forced on pipe and the thread is cut. It is made of malleable iron and steel, and while light in weight, making it convenient to carry, is very strong and rigid. No. 1 threads ¼ to 1 inch pipe, takes die 2 and 2½ inches square. No. 2 threads 1 to 2 inch pipe, takes die 2½, 3 and 4 inches square. It is sold by leading jobbers and the manufacturers will send complete information on application, mentioning DOMESTIC ENGINEERING.

Arthur L. Hersum, Boston, is plumbing a residence for Mr. Shaw, using Cooper's Nautilus closets, baths, lavatories, etc.—Adv.

John C. Gunzer, Chestnut Hill, is plumbing a residence for Colonel Goodman, using Cooper's closets, baths, lavatories, etc.—Adv.

NEW SUPPLY COMPANY INCORPORATED.

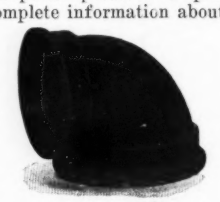
The Engineers and Plumbers' Supply Company, Columbus, O., was incorporated with $25,000 capital stock on Saturday by James Westwater, F. M. Rine, Thomas Murnane, W. G. Westwater and Joseph McCue.

The Jennings Co., Fitchburg, Mass., are doing some work in Baldwinsville, in which they are using six of Cooper's closets.—Adv.

DOUBLE BEAD CAST IRON FITTINGS.

So much favorable comment has been made on the Double Bead Fitting, that we show a photograph reproduction of this style of fitting manufactured by the Western Tube Company, Kewanee, Ill.

This illustration gives a fair idea of distribution of metal to secure greatest strength at a point subject to severe strain, resultant in a fitting uniform in strength throughout, besides adding symmetry much appreciated in modern power plants and sprinkler systems. Complete information about this and

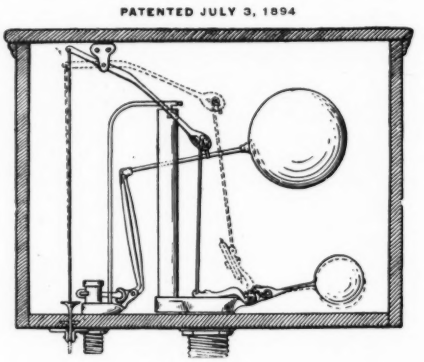


their many other excellent products may be had on application, mentioning DOMESTIC ENGINEERING.

W. J. McGuire & Co., Toronto, are installing three of Cooper's Nautilus closets in a fine residence in that city.—Adv.

THE SIMPLICITY LOW DOWN COMBINATION.

Knott & Van Arnam Mfg. Co., of 252-272 Division street, and 251-271 Clay street, Coldwater, Mich., have met with such an enormous demand for their Simplicity low down combination flush valve herewith illustrated, that they have been unable to keep up with their orders, but they are now increasing their facilities and will shortly be able to ship more promptly. The reason why their patent flush valve has made such a hit is no doubt to be found in the fact that it is simple and positive in operation, gives full contents of tank at each flush, has compound lever, high pressure ball cock and large refill tube with adjusting screw,



and is, in short, a perfect outfit. The manufacturers will be glad to send complete information to interested parties who will write and mention DOMESTIC ENGINEERING.

Joseph V. Reagan, Philadelphia, has some nice work on hand in which he is using Cooper's Nautilus closets.—Adv.

A STEAM SPECIALTY CATALOGUE.

Union Steam Specialty Company, of 113 Franklin avenue, Scranton, Pa., are sending their patrons and the trade a very interesting catalogue of their steam specialties, which are said to have stood the test of time and been found reliable. This company makes a very large line of indicators, of which, perhaps, the most well known are the Excelsior and the improved Howard Thompson indicators. These indicators have a reputation as thoroughly reliable instruments. Other steam specialties made by them are Lippincot steam separators, oil extractors, shaking grates, steam pumps, oil filters, feed water heaters, etc. Their catalogue is well written and is interesting reading and they will gladly send it to you if you ask for it, stating that DOMESTIC ENGINEERING told you to do so.

W. P. Ogelsby, Philadelphia, is placing additional Cooper's fixtures in the Fidelity Trust Co. building on Chestnut street.—Adv.

ABOUT THE HAAS FROST PROOF CLOSET.

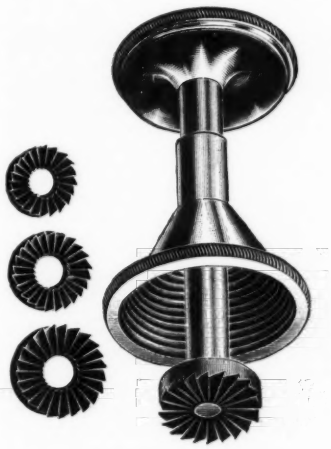
Philip Haas, of 28 South Jefferson street, Dayton, Ohio, has just published a new catalogue of his frost proof closet, the Haas. This catalogue is gotten up very neatly and bears the title: Something that has long been looked for—An invention of the twentieth century. Besides an illustration and a very complete description of his frost proof closet, it contains testimonials from many of the master plumbers who have installed them. One need but read them to be convinced that his is a frost proof closet which has long been looked for. This booklet will be sent to anyone in the trade, who writes him and mentions DOMESTIC ENGINEERING.

Saunders & Esswein, Columbus, Ohio, have some nice residential work on hand in which they are using Cooper's Nautilus closets.—Adv.

John Armstrong, Germantown, is plumbing the residence of Horace E. Moore, using Cooper's Nautilus closets, baths, lavatories, etc.—Adv.

AMERICAN DISTRIBUTING CO.'S SPECIALTIES.

The American Distributing Company, whose factory and warerooms are located at 200-204 Decker street, Syracuse, N. Y., manufacture a very interesting line of plumbers' supplies such as faultless bibb seat dressers, lavatory brackets, cold chisels, plumbers' brass ferrules and gasolene and alcohol torches. Their faultless bibb seat dressers have, the manufacturers think, so

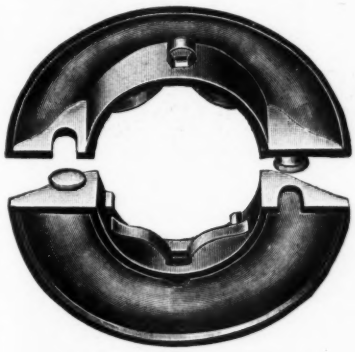


many good points in their favor that no plumber can afford to be without one, considering the low price at which they can be had. Their other specialties are also made of the best material by skilled workmen, so that no one need hesitate specifying their goods when ordering anything in their line from the jobbers. The president of the company, H. Romeyn Smith, assures us that he will see to it that every request for information from readers of DOMESTIC ENGINEERING will be promptly and carefully answered.

John R. Groves, Ocean City, N. J., is plumbing the office building of Messrs. Massey & Edwards, using Cooper's closets, lavatories and other fixtures.—Adv.

A GOOD CEILING PLATE.

The Beaton & Corbin Mfg. Co., of Southington, Conn., who are manufacturers of patent adjustable ceiling and floor plates, pipe hangers, steamfitters' and other special-



ties, and who also do silver, nickel and copper plating to order, are of the opinion that their number 5 ceiling plate which is herewith illustrated is the best spring plate on the market, because it stays in place so well. The reason for this is that it is constructed in such a way as to bring the bearing on the belly of the springs instead of on the ends and it is so easily placed on the pipe. This company have been in the plate business for the past ten years and made it their principal study and they say that it has been their experience that a spring plate, whose spring encircles the plate, cannot stay in place as well because it does not have the grip. They make six different styles of plates, consisting of spring, set screw and radiator plates, and they will be glad to send samples and prices to interested parties who write for same, mentioning DOMESTIC ENGINEERING.

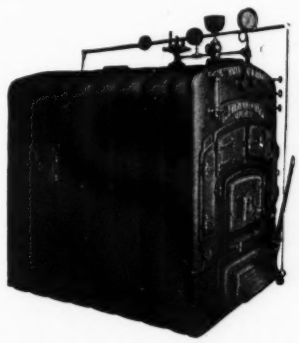
Geo. E. Thompson, Newtonville, Mass., is plumbing the apartment house of Mr. Towner, Newton Centre, using Cooper's closets, baths and lavatories.—Adv.

FURMAN BOILERS FOR STEAM AND HOT WATER HEATING.

The subject of modern steam and hot water heating for residences is constantly receiving more and more attention and has already come to be recognized as the most important and necessary part of the modern and healthful home of to-day.

Comparatively few people are aware of the great comfort, evenness of heat, freedom from coal gas and dust and the great economy of fuel that is attained by the use of modern low pressure steam and hot water heating as compared with other methods and it may be appropriate at this time to present the following facts:

First, the heat derived from a steam and hot water system is most healthful, the pure air in the room being heated by its contact with the radiators and not being a mixture of dust and gas as is always the case with hot air furnaces.



Second, it is possible to more absolutely distribute the heat than with any other method or system and the temperature may be evenly regulated as may be desired. Ease of management is another important consideration and the celebrated Furman steam and hot water boilers are so simply arranged that the average housewife can attend to them with very little care and attention.

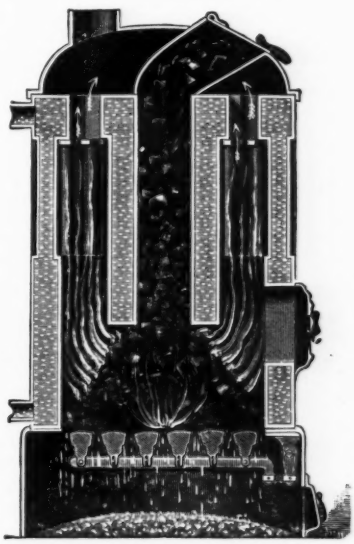
Finally, in economy of fuel where these systems are used. It has been proven in actual test that an efficient and properly installed Furman steam or hot water system will save from 25 per cent to 33 1-3 per cent in fuel over any other known method. This claim alone should commend it to every thinking house owner, as it will be apparent that its first cost would be saved in the course of a few years.

We present in our columns a cut of the Furman new sectional boiler for steam or hot water. This represents the highest and most compact style of boiler efficiency for heating purposes. It is only one of the many manufactured by the enterprising makers, The Herendeen Mfg. Co., of Geneva N. Y., whose boilers are widely used and have for years been extensively used and specified by the leading architects of the country and we suggest and commend to those who are not yet acquainted with the merits of this modern and economical system to write the manufacturers, whose name is given above, for their catalogue and other printed literature, describing fully and convincingly the superiority of their system. The company's line is a large one, embracing portable, sectional and brick-set styles ;the capacities running up as high as 8,000 square feet of radiating surface. The company has been established for years, their boilers having taken the highest awards wherever exhibited. In deciding so important a question as the one of heating it would be well to consider a system the success of which is the best evidence for its use. We know that the manufacturers will cheerfully send full information regarding their system and will even furnish estimates of cost free of charge, if mention is made of DOMESTIC ENGINEERING.

J. A. Morris, Bryn Mawr, Pa., is plumbing the residence of Mr. Chas. Sims, using Cooper's closets, baths, lavatories and other fixtures.—Adv.

THE HERBERT JUNIOR HOT WATER HEATER.

The accompanying illustration is a sectional view of the Herbert Junior hot water heater, which is manufactured by the Herbert Boiler Company, of 240-242 Root street, Chicago, who make the following claims for



it: It has an unusually great heating capacity, great economy in the use of fuel, is twelve to twenty inches lower than any heater made, which is of great importance in low basements or when large tank is used. It is a hot water heater with a water magazine, and it has magazine or surface feed for hard or soft coal. It is guaranteed to be tight under any working pressure and to heat more water with less fuel and with a smaller grate surface than any heater on the American market. Catalogue containing complete information about this and their other heaters will be sent promptly on request, mentioning DOMESTIC ENGINEERING.

Buerkel & Co., Boston, are plumbing a summer residence in Jefferson, Me., using Cooper's Nautilus closets, baths, and Clipper brass work throughout.—Adv.

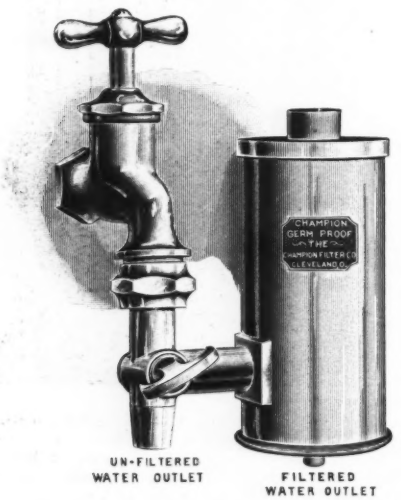
J. H. Sullivan, Newton Centre, Mass., is plumbing several houses in that city, using Cooper's closets, baths, lavatories, etc.—Adv.

Improved Water Filters.

The Champion Safety Lock Co., Cleveland, O., are manufacturers of the Champion Germ-Proof Water Filters, which are reliable germ-arresters, producing sterilized, aerated, sparkling water and are the only complete and perfect filters in the world.

Numerous parasites, germs and microbes find their way into the human body through the avenue of the water we drink, and as our municipal water supplies are contaminated by disease-producing germs, diseases such as diarrhea, dysentery, ague, yellow fever, malarial fever, and that most severe of all diseases due to impure water, *typhoid fever*, are contracted by the use of impure water.

The Champion faucet filters are made in the two styles as shown by the accompanying illustrations, and in five series, any of which will fit either plain or threaded end faucets. The filters are made of brass, nickel plated and the filtering medium is a Tripoli natural stone tube, from the surface of which all germs and accumulated filth are easily removed. To remove the filter tube for cleaning it is only necessary to give the bottom a



half turn to the left, when the tube can be withdrawn, quickly cleaned, returned to and locked in its proper place and a perfectly water-tight joint is automatically made by a simple and ingenious arrangement.

Style C. Filters have a special three-way faucet attachment which allows either filtered or unfiltered water to be drawn without detaching the filter from the faucet; a very desirable feature.

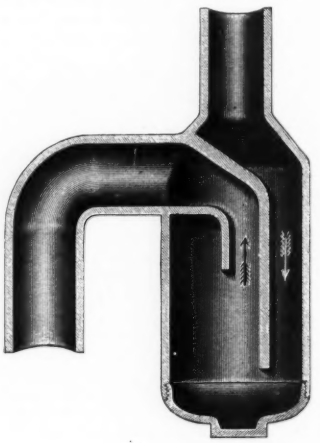
The Champion Filters are economical—the original price is low—when after long usage the stone tube is worn out, by replacing it, at a small cost, the filter is practically as new.

Upon application to the manufacturers, mentioning Domestic Engineering, they will be glad to forward catalogue of their entire line, which includes The Champion Automatic Cleaning Filters and other styles.

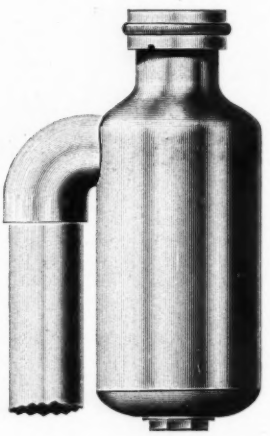
O. E. Smith, Staunton, Va., is remodeling the plumbing in a residence in that city, using Cooper's Nautilus closet.—Adv.

The Newton Sanitary Trap.

Providence Steam Trap Company, of 16 Diamond street, Providence, R. I., are informing the trade about their Newton san-



itary trap, which we are glad to illustrate herewith. Some of the advantages possessed by this trap, as claimed by the makers, are: It is simple and most effective, is an excellent self-scouring trap and has no balls or valves to get out of order, and still another point in its favor is that the partition in these lead traps is made nearly twice the thickness of the body. This trap is so efficient and excellent that it is now allowed to be used without back-venting in Providence and twenty other large cities in the United States and Canada.



Here is what the plumbing inspector of Newport, R. I., R. L. Oman, says about this trap: "I think I am safe in saying that the Newton trap stands A No. 1 against all traps for self-scouring and siphonage and would cheerfully recommend it to be used anywhere. We allow it to be used here in Newport without back-venting."

The following testimonial from R. P. Fleming, sanitary engineer of Montreal, P. Q., is also very interesting: "I found on experimenting with the Newton trap that it resisted siphonage better even than the ordinary lead trap with ventilation under the conditions in which the experiments were made. I can confidently recommend it as a safe and admirable trap for sinks, washbowls, baths and urinals. It is an article that is greatly needed and meets the case exactly."

The makers are inclined to think that parties who value their health should order this trap and take no other and they will be glad to send illustrated and descriptive circular to interested parties who write for it, mentioning Domestic Engineering.

John R. Blinkhorn, Philadelphia, has some alteration work on hand in which he is using Cooper's Nautilus closet.—Adv.

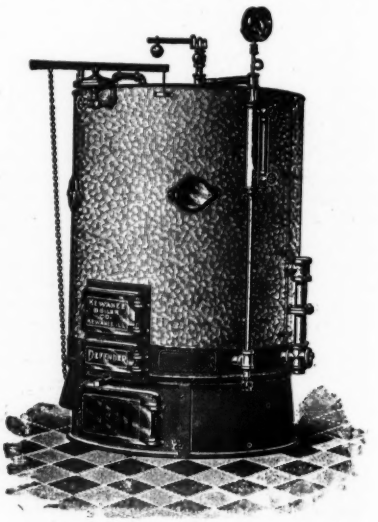
New Engine Company.

The Sleeper Engine Co., with a capital stock of $250,000, will shortly apply for incorporation for the purpose of manufacturing engines, boilers and machinery of all classes. The works will be in Montreal.

J. H. Sullivan, Newton Centre, Mass., has been making additions in the brick block in that place, using Cooper's Nautilus closets. —Adv.

The Defender Boiler.

The Defender boiler herewith illustrated is made by the Kewanee Boiler Company, of Kewanee, Ill., and 169 E. Lake street, Chicago, Ill. It is made for steam and hot water, is portable and has brick set surface burner. It is a plain surface burning boiler and differs from most of the surface burning boilers on the market by having no horizontal fire surface and consequently does not require as frequent cleaning as others. Other good features about this boiler are that the fire door is placed far enough above the grate to allow enough fuel to be put in at one time to run over night; the clinker door is placed on the grate level and allows cleaning of the grate or the removing of clinkers with less trouble than many other boilers. This is an exceedingly good boiler considering its moderate cost.



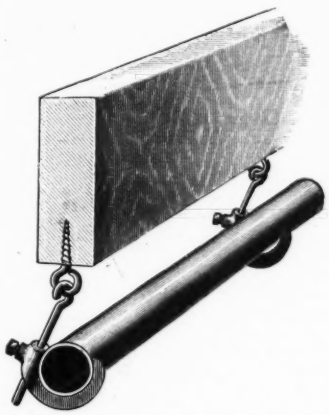
The Kewanee Boiler Company are one of the largest manufacturing concerns in the steel heating boiler line in the United States. Their line comprises, besides the Defender, also the Haxtun, Great Northern, Kewanee fire box boiler, Defender-junior, Tabasco, Tabasco tanks and tubular boilers, and they will gladly send complete information to anyone who asks for it and mentions Domestic Engineering.

F. J. McGarry & Bro., Philadelphia, have several nice operations on hand in which they are using Cooper's baths and other goods.—Adv.

John C. Gunzer, Chestnut Hill, Philadelphia, is installing Cooper's Nautilus closets, baths, lavatories and other goods in an operation he has on hand.—Adv.

A Hanger That Is Adjustable.

The illustration below gives a good idea of the "K" adjustable pipe hanger, manufactured by Kriebel & Co., 826 Spring Garden street, Philadelphia. It lacks none of the good points that a practical, serviceable hanger should have, and possesses special advantages which are peculiarly its own. It can be easily put on or taken off while the pipe is in position, and can be adjusted accurately without the use of any tool except an ordinary monkey wrench. In contrast to pipe hangers of a more or less rigid character, it readily gives and adjusts itself in conformity with the contraction and expansion of the pipe. The following letter from a prominent engineer, contractor and



steam and hot water heating specialist shows what is thought of the "K" hanger by one who has used it in large quantities and thoroughly tested its efficiency:

Grafton, W. Va., March 3, 1902.

Messrs. Kriebel & Co., Philadelphia, Pa.

Gentlemen: Yours of a late date in reference to your adjustable hangers at hand and contents noted. I have used your hangers for a number of years, and in the meantime have tried almost everything else in that line, and find yours the most convenient and easiest adjusted of anything on the market. Yours truly,

Alex. Zeck.

A line to the manufacturers, mentioning Domestic Engineering, will bring a descriptive circular and price list.

M. W. Jackson Plumbing Co., St. Joseph, Mo., has several operations on hand in which they are using Cooper's closets, lavatories, bath and other goods.—Adv.

The Paragon Boilers.

Isaac A. Sheppard & Co., of 1801 N. 4th street, Philadelphia, Pa., who are so well and favorably known as manufacturers of a large line of efficient and reliable steam and hot water boilers, known under the name of Paragon, are calling the attention of the trade to some of the good points found in these boilers, such as the perfect flue system, a patented special corrugated nipple, which makes a perfectly water tight joint and is far superior to either a screw joint or a push nipple. Other points in favor of the Paragon boilers are that additions or repairs can easily be made and that the joints cannot possibly rust fast. Every one of these boilers has just the right proportion preserved between the grate, fire and flue surface,—no guess work. Their catalogue, which is sent promptly to readers of Domestic Engineering on application, goes into detail more than space allows us to do here. The practical results to the fitter is that every Paragon boiler erected will operate perfectly, and the man who is bright enough to secure the Paragon agency will, the manufacturers think, establish a satisfactory trade and his bank account will expand.

Sullivan Plumbing & Htg. Co., of Bay City, Mich., have some fine work on hand in which they are using two of Cooper's Nautilus closets.—Adv.

Heaters That Heat.

The Richmond Stove Company, of Norwich, Conn., whose western managers are the Chicago Heater and Supply Company, at 54 Dearborn street, Chicago, and who have their New York place of business at 85 Centre street, are sending their patrons and the trade a neat circular illustrating and describing their large line of Richmond heaters, which, according to their claims, possess the most perfect system of

heating, being the culmination of years of experience and the result of exhaustive tests in the principles of construction. We are glad to show herewith just one of their many styles.

This company are also makers of a very interesting line of tank heaters which are very powerful and reliable. The boiler proper of each is one casting. They have no joints and no packing and cause no trouble, and another good point in their favor is their extra deep fire-pots which are equipped with Richmond triangular grates. These tank heaters are especially adapted for heating small cottages, conservatories, offices and stores and for furnishing large quantities of hot water for residences, apartment houses, hotels, laundries, bathrooms, etc. They will be glad to send their catalogue and latest circulars to interested parties upon application, mentioning Domestic Engineering.

John C. Gunzer, Chestnut Hill, Philadelphia, is plumbing the residence of Mr. Geo. C. Thomas, using three of Cooper's baths, Nautilus closet, etc.—Adv.

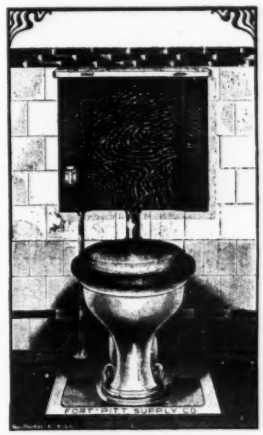
Fine Gas Stove Catalogue.

George M. Clark & Co., manufacturers of the now famous Jewel gas stoves, are sending their patrons and the trade an exceptionally neat and finely illustrated catalogue, containing a full line of high-grade engravings showing their many different types of Jewel gas ranges and circulating water heaters accompanied by complete descriptions. It contains also several cuts of their new Jewel gas instantaneous and portable water heater which received gold medal at Pan-American exposition at Buffalo, and which seems to be a very practical and efficient water heater, judging from the illustrations of it in this catalogue. This heater is only fifteen inches long, twelve and one-half inches wide and twelve inches high, which facts together with its moderate cost are sure to cause it to be in increasing demand. This catalogue has also a fine view of this company's works at Harvey, Ill., which is one of the largest of its kind in the world, having a floor space of three and one-half acres. If interested in any of the above mentioned articles better write at once to Geo. M. Clark & Co., 72-76 Lake street, Chicago, mentioning Domestic Engineering, and you will be sure to get their catalogue.

John D. Smith Co., Buffalo, have some alteration work on hand in which they are using Cooper's Nautilus closets.—Adv.

Fort Pitt High-Grade Water Closets.

The Fort Pitt Supply Company, of 525 Wood street, Pittsburgh, Pa., manufacturers and jobbers of plumbing goods, are



calling the attention of the trade to their very interesting line of high-grade water closets, one of which, the "Recio," pattern No. 118, is illustrated in the accompanying cut. The recess tank used in combination with it is one that is always sure to give satisfaction. It is made of quartered oak, lined with twelve-ounce tinned copper and having marble top and Young's special fittings. The Recio closet, pattern No. 118, is, as will be noticed in the illustration, very finely shaped and is furnished with quartered oak seat and lid, nickel-plated flush and supply pipes. Mahogany woodwork or embossed bowl furnished if desired. Catalogue containing complete information about this and their other high-grade closets will be sent to interested parties on request, mentioning Domestic Engineering.

James & Bondon, Boston, are plumbing the new house of Mrs. Slater at Whitingsville, Mass., using eight of Cooper's Nautilus closets.—Adv.

A Piece of Artistic Advertising.

The ability of the American engineer to design steel structures of great strength and pleasing architectural effect, is shown in the eight half-tones on the handsome souvenir mailing card issued by the Joseph Dixon Crucible Company, of Jersey City, N. J. The card is a piece of artistic advertising on the part of the company, and will prove of decided interest to constructing engineers and architects, to whom it will be sent on request.

Dixon's silica-graphite paint, which protects these structures from corrosion, has been very extensively used in the south, west and sea-coast sections of the United States, also in Mexico, Australia, China, Japan, West Indies and Philippine Islands, and has proven its protective and wearing qualities in all climates.

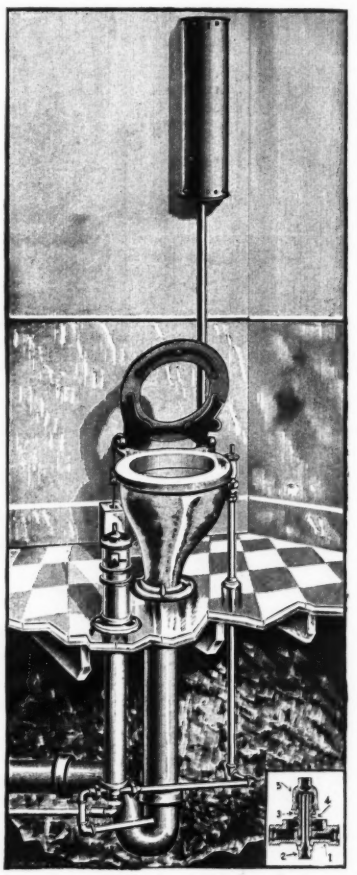
THE IDEAL LOW TANK COMBINATION.

The Ideal Mfg. Co., of Detroit, Mich., whose specialties are water closets and traps, low closet combinations, complete and centrifugal adjustable traps with all connections for lavatories, kitchen sinks and urinals, also slop sink and house drain traps, etc., would like to have those members of the trade, who do not yet know their products, investigate them. They are of the opinion that anybody has a right to know what he is buying, and the Ideal low tank combination herewith illustrated will, according to their claims, stand the most rigid inspection, both inside and out. The finish of the woodwork, the construction of the seat, the style of the tank, the ball cock, the flush valve, the lining, in fact everything about an Ideal low down bespeaks workmanship and ingenuity. It is an unusually interesting and dainty combination, and complete information about this and their other equally interesting articles can be had on application, mentioning DOMESTIC ENGINEERING.

E. W. Watts & Sons Co., Terre Haute, Ind., are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

THE HAAS FROST-PROOF CLOSET.

The accompanying cut illustrates the Haas frost-proof closet which is patented and manufactured by Philip Haas, the well known plumber, of 28 So. Jefferson street, Dayton, Ohio. Of the many claims which Mr. Haas makes for this closet it gives us pleasure to enumerate a few, viz.: It guarantees the same flush every time, has the simplest valve, a screw driver and a monkey wrench being all that are necessary for its repairing, it has no fuller balls or rubber packing of any kind, and works entirely on the compression system, three leather washers not larger than 1½ inches in diameter being all that are necessary for its packing; there is no chain to stretch, its operation depending only on material to which there is no stretching, and when once adjusted will always operate the same. It works successfully without a pit; the valve is made of the best material and its connections are all made with ground joints and it can be repaired without shutting off the supply and lastly is very easily connected. It is especially adapted to hard usage. Interested parties will be supplied promptly with complete descriptive and illustrated circular upon application, mentioning DOMESTIC ENGINEERING.



The Howell Plumbing & Construction Co., Philadelphia, are plumbing the new Stinson factory, using Cooper's closets and other fixtures.—Adv.

A GREAT TUBE CLEANER.

The Atlas Pipe Wrench Co., manufacturers of the Atlas Tube Cleaner, report great success with their latest specialty. Samples of scale on exhibition at their office at 121 Liberty St., testify to the great efficiency of the Cleaner, and show the wonderful work the Atlas Tube Cleaner is capable of doing—as, no matter how thick or how hard the scale is, the Atlas Tube Cleaner does remove it.

O. P. Chapin, Camden, Me., is plumbing a summer residence on the Isle of Haut, using five of Cooper's closets, four of their baths, and other plumbing fixtures.—Adv.

CLOSET PULLS AND SANITARY CHAINS.

Williams & Marvin Mfg. Co., of Deep River, Conn., who are manufacturers of a very large line of closet pulls, and who also make mallets, handles and variety wood turnings in native and foreign woods, are just now notifying the trade that they are prepared to open accounts with manufacturers and jobbers who need a full and perfectly reliable line of closet pulls. Their

pulls are finished in natural and red cherry, ash, natural and antique oak and black walnut; and they are so perfect in every respect that they will prove an ornament to the finest closet made and they are sure to sell on their own merits. Interested parties will be favored with their new catalogue on application, mentioning DOMESTIC ENGINEERING.

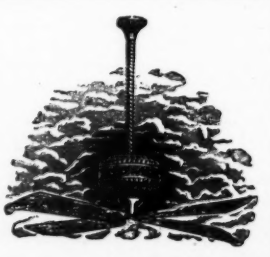
This company are also makers of a large line of plumbers' sanitary chains, which, according to their claims, are so constructed as to prevent the accumulation of dirt and germs in the links, thereby making it the chain that is best fitted for use on fine sanitary plumbing. Their chains are made by automatic machinery, insuring perfectly reliable chains.

Robert B. Caverly, Washington, D. C., is remodeling the plumbing in a residence in that city, using Cooper's Nautilus closet.—Adv.

FANS WATER FANS FOR DESK AND WALL ONLY

ELECTRIC FANS
FOR CEILING, DESK, WALL OR COLUMN
ANY VOLTAGE

SEND FOR CATALOGUE AND PRICES TO D. L. BATES & BROTHER, Dayton, Ohio



An Interesting Card.

The Field Force Pump Company, of Lockport, N. Y., have gotten out a very neat mailing card, on the front of which is a fine picture of the machinery building at the Pan-American Exposition, printed in colors, together with a view of the Niagara Falls. On the back of the card is an illustration of this company's corner in machinery building at the Pan-American. This exhibit won the silver medal which was the highest honor awarded in this class. They claim that their pumps are easiest in the work, finest in the spray, most thorough in the stirring. Their catalogue will be sent free upon application, mentioning DOMESTIC ENGINEERING.

E. Zweibel, Pottsville, Pa., are installing Cooper's Nautilus closets in a residence in that city.—Adv.

This Is a Handsome One.

These are the days of artistic catalogues and DOMESTIC ENGINEERING has received one from the Nason Manufacturing Company, 71 Fulton and 71 Beekman streets, New York City, which is really a work of art. The covers are Nile green, with the name of the firm in illuminated letters, the whole tied together by a silk cord in a shade of green which harmonizes well with that of the covers. The first and second pages call attention to the bath room and its accessories manufactured by the above firm. Page three is devoted to the care of enameled baths.

The next twelve pages fully describe the various style of enameled bath-tubs manufactured by this firm, ranging in price from $19.50 to the "Arlington," which, supplied with 4¾-inch enameled roll rim, with nickelplated bottom bell supply fittings, compression valves, brass supply pipes and imperial bath waste, and nickelplated brass shower with shampoo and tubular shower. ring and rubber curtain, exterior finished in ivory white with gold rims, sells for $175. The next few pages are devoted to foot and sitz baths, which are made in various sizes.

THE "SENECA"

Then is shown the Nason porcelain shower bath receptor, which is made in one piece of solid porcelain, glazed white inside and outside and made in two sizes. Following this is a description of the various kinds of shower bath apparatus, the combination needle and shower, nickelplated shower with shampo and tubular shower. The next few pages adequately explain and describe the Nason Open Lavatory in Italian marble and enameled iron. Then is shown the Nason low down closet apparatus, which are furnished in oak, cherry, quartered oak and walnut. Their "Seneca" is a plain bowl siphon jet closet, with cabinet finish hardwood seat and cover attached to bowl with nickelplated brass offset hinges, No. 3 solid bent push button tank complete with 2-inch flush connection; nickelplated supply pipe, with escutcheon; brass floor flange and nickelplated bolts and washers. The balance of the catalogue is devoted to the Nason Imperishable white porcelain and vitrified brown pantry kitchen and slop sinks and porcelain enameled laundry tubs. The catalogue is profusely illustrated with beautiful half-tone engravings of all goods manufactured by this company. In writing for same mention DOMESTIC ENGINEERING.

Robt. Major, Philadelphia, is plumbing a Spruce street residence, using Cooper's Nautilus and Reno closets.—Adv.

Berger Bros. Co.'s Reliable Articles.

Berger Bros. Co., of 231-237 Arch street, Philadelphia, Pa., who are so well known as manufacturers of an exceedingly large and at the same time fine grade of metal goods, among which we might mention such as solder, registers, ventilators, elbows, valves, plungers, hooks and straps are just at present notifying the trade about the reliability of their malleable and wrought iron pipe hooks and straps, of which illustrations are herewith shown. They have a very complete stock of every size and kind and the quality is the best that can be made. Their B. B. ornamental pipe straps are all even, clean cut and brightly tinned. If

you do not know their articles, which, they claim, cannot be excelled, you should give them a sample order next time you need anything in their line or you should at least get their catalogue, which they send promptly on application, mentioning DOMESTIC ENGINEERING.

G. Wilbur Thompson, Newton Centre, Mass., have a contract in which they are using Cooper's closets, baths, etc.—Adv.

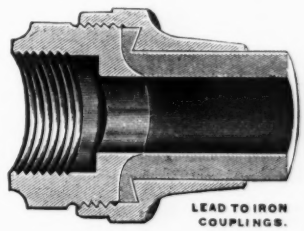
H. F. Neumeyer's New Inventions.

H. F. Neumeyer, of Macungie, Pa., the well-known inventor and manufacturer of some very desirable and effective hose couplings and menders, lawn sprinklers, locknuts, spray and solid stream nozzles, who recently placed a new hose coupling, the Never Slip, on the market, which was made of brass and iron, has now placed a still later pattern, the Brass Never Slip, hose coupling on the market, which seems to be a very clever and effective coupling. It is made of brass, as its name indicates.

Another invention for which Mr. Neumeyer has just applied for patent is the New nozzle, which is also made of brass and finely polished. This nozzle is especially well adapted for tree spraying, as it gives a fine mist spray. It does not clog, as the hole is always full open. Other good features found in this nozzle are that it is substantial and cheap, gives a perfect solid stream and a perfect fan spray and causes no back pressure. These two latest products from H. F. Neumeyer's factory are now on market; they are sold to the trade only and jobbers who have not yet secured a supply of them should at once get complete information and price lists, so as to get in shape for the early spring trade. Kindly remember mentioning DOMESTIC ENGINEERING when writing.

Novelty Coupling a Clever Device.

The New Haven Novelty Machine Co., of New Haven, Conn., have recently placed on the market a new patented device designed to take the place of the wiped joint in connecting lead to lead or lead to iron or brass pipe. Its main features are, according to



the manufacturers, simplicity, absolute security of joint, ease and speed in application, and reasonableness of cost. Their reports from plumbers show an average saving of fifty per cent in cost of making joints. As will be seen from the accompanying illustration no solders and no washers whatever are used. It is, in short, a very clever device which cannot fail to be of unusually great interest to plumbers. Anyone not knowing this practical device ought to write at once for complete information, which will be furnished promptly on application if mention is made of DOMESTIC ENGINEERING.

Sisson Insertable Joint.

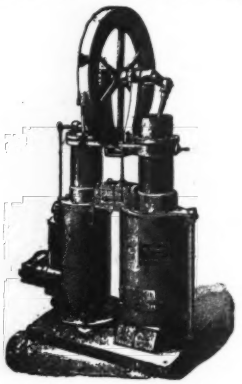
The accompanying cut illustrates the Sisson insertable joint for soil pipe, manu-

factured by R. Estabrook's Sons, South Boston, Mass. It is made in sizes from two to six inches, and the unusually large demand for it in latter years has made the manufacturers believe that it absolutely indispensable to plumbers. Fact is that it makes a job look neat and saves patience. It is sold by jobbers and the manufacturers will be glad to send illustrated and descriptive circulars on application, mentioning DOMESTIC ENGINEERING.

John W. Chestnut, Philadelphia, is plumbing the residence of Mr. Allen, using Cooper's Nautilus closets, baths, lavatories, etc.—Adv.

THE DENNEY RIDER ENGINE.

The American Machine Company, of Wilmington, Del., well known as manufacturers gines. The American Machine Company of the Denney improved Rider & Ericsson hot air engines, are informing the trade about the good qualities of this machine, which we are glad to illustrate herewith. Some of these good features are, the manufacturers say, that for pumping water no more reliable and economical engine can



be found. It can be operated by any one and any kind of fuel can be used. It is perfectly safe, noiseless and always ready for service. It possesses, according to the makers, important improvements patented and not found in any other make of enhave been making this engine for years and they know just how to do it. Interesting catalogue and list of testimonials will be sent promptly on application, mentioning DOMESTIC ENGINEERING.

THE PERFECTION SAFETY VAPOR AND SHOWER BATH.

Vapor Shower Bath Company, of Rochester, N. Y., and Berlin, Ontario, are of the opinion that they have devised an ideal

scientific cleansing apparatus in their combination vapor and shower bath herewith illustrated, which they call the Perfection Safety, because it is perfectly safe, and they claim it is the original and only combination bath made in the world. The person who uses it once will most likely never do without it. The ease with which it is operated from beginning to end is a surprise to one who tries it. The shower bath may be taken in five minutes, refreshing, invigorating and strengthening you more than words can tell. The whole bath, in-

cluding both vapor and shower, does not require more than fifteen to twenty minutes. Complete information about this very desirable and sanitary fixture will be sent to any one writing for it, mentioning DOMESTIC ENGINEERING.

The "Winchester" Heater is no ordinary casting. It is, as a heater, imposing in excellence, and pre-eminent in construction. Have you ever seen one in operation? We can hardly imagine a fitter who has, failing to ask the particulars as to an agency. Manufactured by Smith & Thayer Company, Boston, Mass.

TRADE WANTS.

TRAVELING MEN, ATTENTION—WE HAVE some taking specialties in the heating line which we desire traveling men to present as "side lines" to the trade. We shall be glad to correspond with those who can furnish satisfactory references. Address, 1882, care Domestic Engineering, 64 N. Jefferson St., Chicago. t.f.

WANTED—A MANAGER FOR CHICAGO branch of a large eastern manufacturer of furnaces, ranges and boilers. Fine opportunity for a man of energy and ability who controls some trade. Address, with full particulars, "Manufacturer", care Domestic Engineering, Chicago, Ill. w. & m. t.f.

SITUATION WANTED—STEAM AND HOT water heating. Wide practical experience in all grades of large and small construction. Competent in every feature of the business. Push energy and good judgement. Economical, systematic, successful manager. Profitable, satisfactory results. Good habits, good references, good record. Address "W E." care Domestic Engineering, Chicago. t.f.-m.

PLUMBERS AND STEAM FITTERS MAKE best agents for specialties in sanitary and heating lines. We desire five hundred plumbers and steam fitters of good repute who can furnish satisfactory references, to act as introducing agents for our specialties to the consuming trade. We pay liberal commission but only desire to do business with those whose reference is satisfactory. Address, 1817, care Domestic Engineering, 64 N. Jefferson St., Chicago t f.

ENAMELED BATH TUBS, SINKS, ETC., ETC. Information given by a specialist of 25 years experience, to produce the finest product in enameled bath tubs, sinks, etc., that can be made. Recipes and formulae furnished to avoid all difficulties in manufacturing process. Also plans and estimates of the most modern and best smelting and muffle furnaces. Plans and specifications furnished to change out of date factories to the most modern equipment. Tubs produced by my process guaranteed of 90 to 95 per cent first class ware. All business strictly confidential. Address "B No. 136", care Domestic Engineering, Chicago. 5-14-M.

Domestic Engineering

Monthly Edition.

Plumbing, Heating, Lighting, Ventilating Engine, Mining and Mill Supplies.

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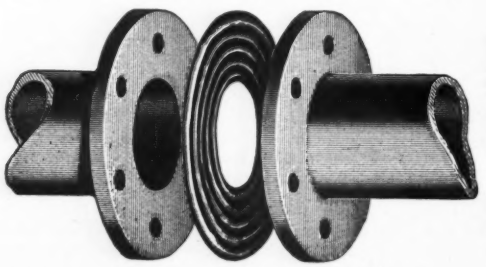

OUR PATENTED
MINERAL WOOL PIPE COVERING AND COPPER GASKETS
THEY SAVE STEAM AND MAKE ABSOLUTELY TIGHT JOINTS
BEST AND CHEAPEST
SAMPLES FREE
UNITED STATES MINERAL WOOL CO.
143 Liberty Street, NEW YORK.

On January 8th, 1902

THOMSON

Meter Company

79 Washington St., Brooklyn, N. Y.,

STAMPED WATER METER

200,000

We Stamp our Meters only as they are sold.

Highest Award for Pipe Wrenches

ATLAS PIPE WRENCHES RECEIVE HIGHEST AWARD AT PAN-AMERICAN EXPOSITION.

Ask your supply man for the "ATLAS"

If you are not using the "ATLAS" (The Pipe Wrench with the three slot adjustment) give it a trial and and we believe you will be satisfied. Made in Four Sizes—10 in., 18 in., 24 in. and 36 in., handling everything from ⅛ inch wire to 4½ inch pipe.

Manufactured by

ATLAS PIPE WRENCH CO.

Flood Building, San Francisco, Cal.

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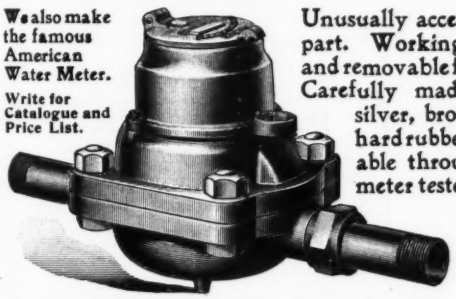
The Niagara Water Meter

We also make the famous American Water Meter.

Write for Catalogue and Price List.



Unusually accessible in every part. Working parts separate and removable from outer case. Carefully made of German silver, bronze, brass and hard rubber. Interchangeable throughout. Each meter tested for accuracy and to a hydraulic pressure of 300 lbs. per sq. inch.

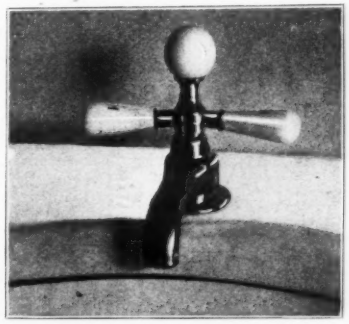
Buffalo Meter Co., 363 Washington St., Buffalo, N. Y.

The Boylston Basin Supply Combination

PATENTED.

A LAVATORY FIXTURE

That supplies *Hot, Cold* or *Mixed* water and operates the *Waste* through only *One Hole* in the slab, as simple as a Fuller Stop Cock. Will deliver a *very small stream* or *full force* at *any desired temperature* from any pressure.

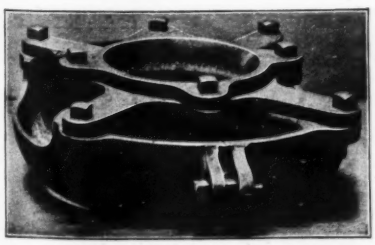


Wm. Bunting, Jr.

MANUFACTURER

388 Boylston St., Boston, Mass.

No More Broken Joints



Replaces cement joint between iron soil pipe and earthenware sewer pipe, keeping sewer gas absolutely out. There is no "IF" about it. Our circular free.

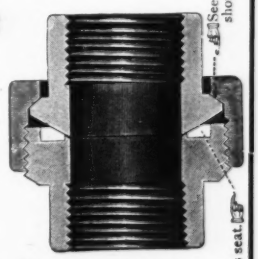
GEORGE F. RYAN & COMPANY

8811 COTTAGE GROVE AVE., CHICAGO, ILLINOIS.

THE JEFFERSON Union and Flange

Adapted for OIL, STEAM, WATER, GAS, and AIR

Ask Your Dealer for Them. They Save Trouble and Money.

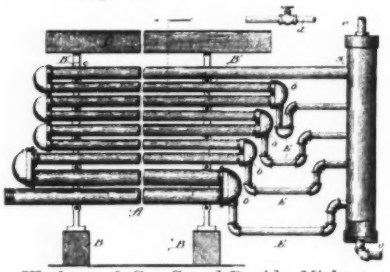


JEFFERSON MANUFACTURING CO.

186 DEVONSHIRE STREET, BOSTON, MASS.

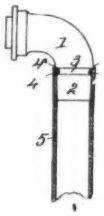
PATENTS AND INVENTIONS

686,432. Steam-Condenser Frederick W. Wolf, Chicago, Ill.



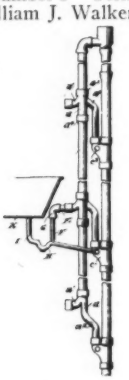
Workman & Co., Grand Rapids, Mich., are installing additional Cooper fixtures in the new hotel in that city.—Adv.

689,684. Sweat-Joint. Philip Mueller, Decatur, Ill., assignor to H. Mueller Manufacturing Co., Decatur, Ill., a Corporation of Illinois.

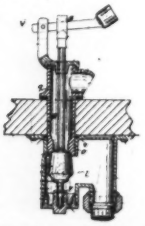


Falmouth Plumbing Co., Falmouth, Mass., have a contract on hand in which Cooper's closets are being used.—Adv.

689,045. Plumber's Fitting. John J. Fruin and William J. Walker, Chicago, Ill.

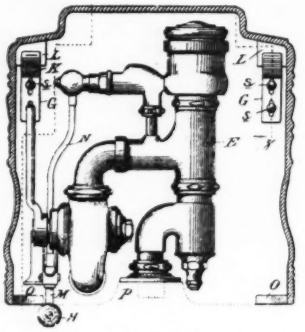


681,302. Flush-Tank Valve. John Denton, Paterson, N. J.

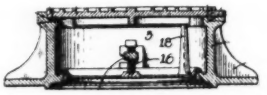


E. Weston, Saginaw, Mich., have some alteration work on hand in which Cooper's Nautilus closets are being used.—Adv.

691,768. Water-closet. Winfield E. Hinsdale, New York, N. Y.

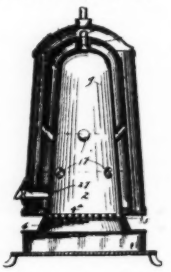


692,231. Manhole-Casing. Charles F. Bingham, Buffalo, N. Y.

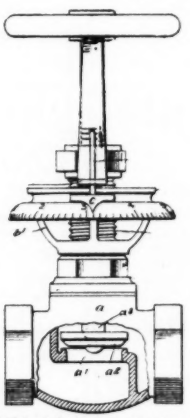


Stinson, Kennedy & Co., Pittsburg, have some nice work on hand in which they are using Cooper's closets.—Adv.

692,329. Hot water Heater. John D. McLinden, New York, N. Y.

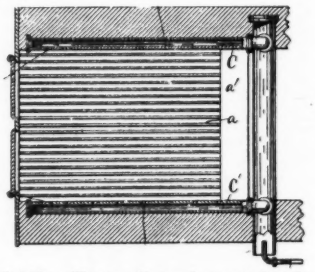


692,391. Valve. Anton Wagner, Manville, R. I.

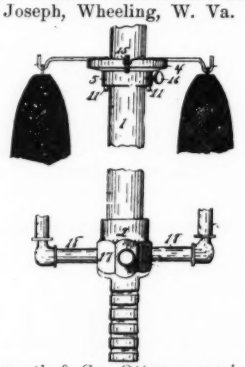


W. B. Hubbard & Son, Boston, are remodeling the plumbing in a residence in that city, using Cooper's Nautilus closets.—Adv.

692,439. Furnace. Joseph G. Geiges, Cincinnati, Ohio.



692,449. Cluster Incandescent Gas-Lamp. Sheldon Joseph, Wheeling, W. Va.



Butterworth & Co., Ottawa, are installing Cooper's showers in a residence in that city.—Adv.

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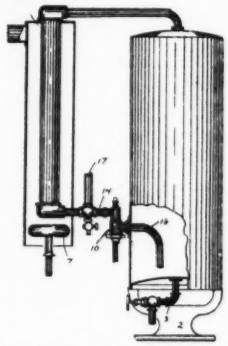
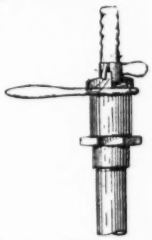
692,480. Water Heater Controlling and Reversing Valve. Frederick W. Robertshaw, Pittsburg, Pa.



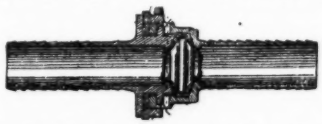
Smith & Forbes, Boston, are plumbing the residence of Mrs. Cheney, Petersboro, N. H., using Cooper's Nautilus closets.—Adv.

692,642. Pipe-Coupling. Oscar Eisenhut, Detroit, Mich., assignor to C. F. Heyerman, Detroit, Mich.



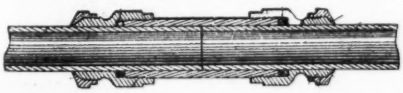
W. J. Robinson, Germantown, is remodeling the plumbing in the residence of Mr. Evans, using Cooper's fixtures.—Adv.

692,795. Hose or Pipe Coupling. Leigh Moyle, St. Louis, Mo., assignor, by mesne assignments, to Handlan-Buck Manufacturing Company, St. Louis, Mo., a corporation.

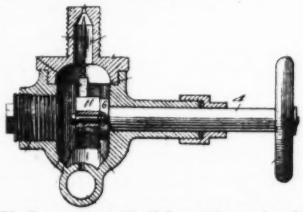


Jos. B. Prosser, Milton, Pa., has some fine Towner, Newton Centre, using Cooper's Nautilus closet.—Adv.

692,881. Pipe-Union. Robert F. Lindsay, Greenville, S. C., assignor to Samuel C. Koonce, Clarksville, Pa., and John S. Leslie, Sharon, Pa.



692,856. Self-Cleaning Needle-Valve. Wilbert J. Jackman, Lima, O.



F. H. Porter, of Wellsley, Mass., is plumbing a residence in that city, using Cooper's Nautilus baths, lavatories, etc.—Adv.

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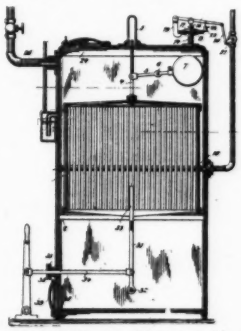
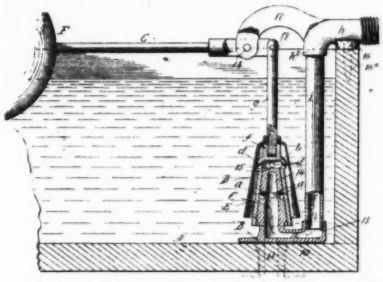
692,638. Acetylene Gas Generator. Ed. N. Dickerson, New York, N. Y.



Catheart & Marvin, Kansas City, Mo., is using Cooper's Nautilus closet in some operation work they have on hand.—Adv.

692,983. Valve for Water-Tank Supply. William E. Clark, Springfield, Mass.

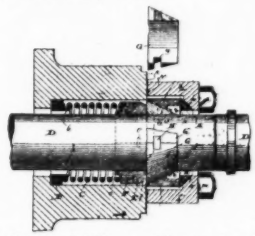


Saml. Z. Martin, Lock Haven, Pa., is installing Cooper's fixtures in a residence he has on hand.—Adv.

693,024. Hose-Coupling Clamp. Ole Iversen, East Berkeley, Cal.

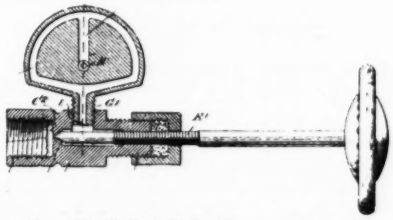
Jas. A. Trane, La Crosse, Wis., is using Cooper's filter in an operation he has on hand.—Adv.

693,046. Metallic Packing. Jacob C. Miller, Milwaukee, Wis.



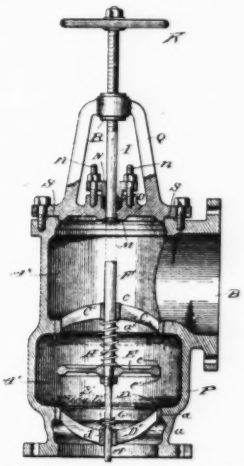
Geo. Soule, Billings, Mont., is plumbing a hotel, using Cooper's closets and other goods.—Adv.

693,225. Hydrocarbon-Burner. George A. Bonelli, Kingman, Ariz.



Chas. W. Geibel, Erie, Pa., has some alteration work on hand in which he is using Cooper's Nautilus closet.—Adv.

693,133. Automatic Duplex Check and Stop Valve. Frank Hennebohle, South Chicago, Ill.

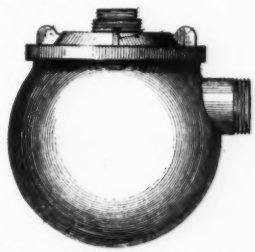


Thos. M. Hennessey, Oswego, N. Y., is installing Cooper's closets in a residence in that city.—Adv.

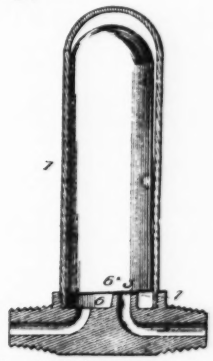
35,617. Urinal. Charles Desormoux, Cleveland, Ohio.

Wm. S. Cooper Brass Works, Philadelphia, made a good sized shipment of Nautilus closets to Germany a few days ago.—Adv.

35,536. Bath-tub trap. Frank A. Radcliffe, Cleveland, Ohio.

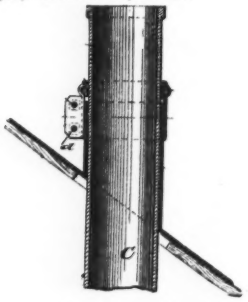


691,769. Radiator Attachment. George W. Nistle, Chicago, Ill., assignor of two-thirds to Robert L. Gifford and Everett W. Brooks, Chicago, Ill.

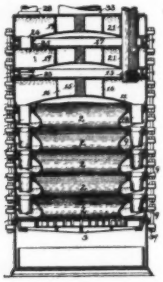


Robt. Major, Philadelphia, is plumbing a residence in Philadelphia, using Cooper's closets, baths, etc.—Adv.

690,350. Roof collar or flange. Thomas P. Bolger, Gloucester, Mass.

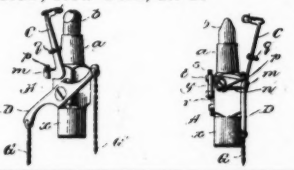


683,073. Water Heater. Fridolin Schifferle, St. Louis, Mo.



682,423. Method of Making Lap-Weld Tubing, Peter Patterson, McKeesport, Pa., assignor to the National Tube Company, New York, N. Y.

689,409. Catalytic Gas-Lighter. William H. Porter, New York, N. Y.



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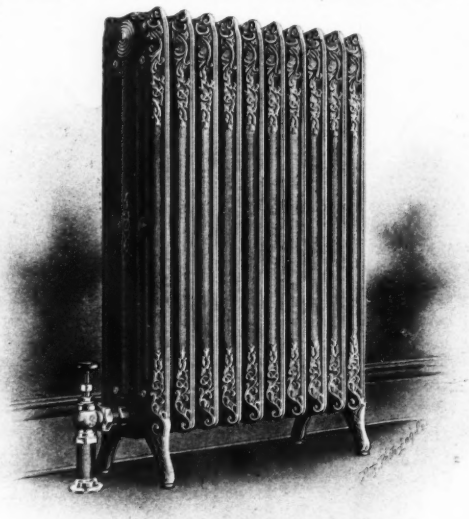

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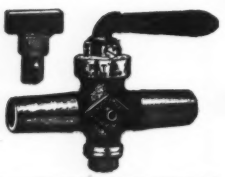

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Weaver, The H. M., Co., Mansfield, O.

Baths, Porcelain Enameled.

McShane, Henry, Mfg. Co., Baltimore, Md.
McVay & Walker, Braddock, Pa.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Weiskittel, A., & Son, Baltimore, Md.

Bath Room Furnishings.

Sternau, S., New York, N. Y.

Boiler Couplings.

Detroit Sanitary Supply Co., Detroit, Mich.
Western Tube Co., Kewanee, Ill.

Brass Goods.

Boston Brass Co., Boston, Mass.
Bunting, Wm. Jr., Boston, Mass.
Crampton-Farley Brass Co., Kansas City, Mo.
Campbell, J. B., Brass Works, Erie, Pa.
Farnan Brass Works, Cleveland, O.
Glauber Brass Mfg. Co., Cleveland, O.
Hays Mfg. Co., Erie, Pa.
Humphryes Mfg. Co., Mansfield, O.
McDonald, A. Y., & Morrison Mfg. Co., Dubuque, Ia.
Peck Bros. Co., Chicago, Ill.
Stebbins, E., Mfg. Co., Springfield, Mass.
Union Brass Works, Boston, Mass.
Zero Valve & Brass Mfg. Co., Buffalo, N. Y.

Brass Railing.

Columbus Brass Co., Columbus, O.

Brass Working Machinery.

Warner & Swasey Co., The, Cleveland, O.

Cellar Drainers.

Braender, Philip, New York City.
Kemp, C. M. Mfg. Co., Baltimore, Md.
McCann, Andrew, Chicago, Ill.

Compression Work.

Central Brass Mfg. Co., Cleveland, O.

Die Stocks.

Curtis & Curtis Co., The, Bridgeport, Conn.
Oster Mfg. Co., Cleveland, O.

Disc Wheels.

Buffalo Forge Co., Buffalo, N. Y.

Domestic Water Supplies.

Kirtley, Geo. P., & Co., Kansas City, Mo.

Drainage Fittings.

Jarecki Mfg. Co., Erie, Pa.

Drain Traps.

Libbey, Parker & Co., Boston, Mass.

Enamelite Baths.

Jas. Walker & Son Detroit, Mich.

Engravers.

American Process Engraving Co., Cincinnati, O.
Field & Beattie, New York City.
Standard Engraving Co., Philadelphia, Pa.

Expansion Tanks.

Oswego Boiler Works, Oswego, N. Y.

Fans, Electric and Water.

Bates, D. L., & Bro., Dayton, O.
Specialty Mfg. Co., Indianapolis, Ind.

Feed Water Heaters and Purifiers.

Webster, Warren, & Co., Camden, N. J.

Ferrules.

Blatchford, E. W., & Co., Chicago, Ill.
Raymond Lead Co., Chicago, Ill.

Filters.

Champion Safety Lock Co., Cleveland, O.
Eclipse Filter Co., Philadelphia, Pa.
Lynn Filter Mfg. Co., The, Cincinnati, O.
New York Continental Jewell Filtration Co., New York City.
Scaife, Wm. B., & Sons, Pittsburg, Pa.

Fittings, Combination.

Illinois Malleable Iron Co., Chicago, Ill.

Fire Pots.

Clayton & Lambert Mfg. Co., Detroit, Mich.

Floor and Ceiling Plates.

Houghton & Buxton Co., Worcester, Mass.

Floats.

Naugatuck Mfg. Co., Naugatuck, Conn.

Flushing Valve Closets.

Ideal Mfg. Co., Detroit, Mich.
Peck Bros. Co., Chicago, Ill.

Fresh Air Inlets.

Hart-Ayres Plumbing Co., Brooklyn, N. Y.

Furnaces, Warm Air.

Kelsey Heating Co., Syracuse, N. Y.
Thatcher Furnace Co., New York City.

Gaskets.

United States Mineral Wool Co., New York City.

Gas, Electric and Combination Fixtures.

Baldinger & Kupferman, Brooklyn, N. Y.
Beardslee Chandelier Mfg. Co., Chicago,
United Metal Mfg. Co., New York City.
Williamson, R., & Co., Chicago, Ill.

Gas Heaters.

Central Supply Co., Columbus, O.

Gas Igniters.

Matchless Chemical Co., Chicago, Ill.

Gas Valves.

Akron Gas Valve Co., Akron, Ohio.

Graphite.

Dixon, Joseph, Crucible Co., Jersey City, N. J.
Wisconsin Graphite Co., Pittsburg, Pa.

Grease Traps.

Sproul & McGurrin, Grand Rapids, Mich.

Heaters, Steam and Hot Water.

Abendroth Bros., Port Chester, N. Y.
American Radiator Co., Chicago, Ill.
Calorific Heater Co., Easton, Pa.
Columbia Heater Co., Chicago, Ill.
Herendeen Mfg. Co., The, Geneva, N. Y.
Gorton & Lidgerwood Co., New York City.
Gurney Heater Mfg. Co., Boston, Mass.
Illinois Malleable Iron Co., Chicago, Ill.
International Heater Co., Utica, N. Y.
Kewanee Boiler Co., Kewanee, Ill.
Lord & Burnham, Irvington-on-Hudson, N. Y.
Magee Furnace Co., Boston, Mass.
McLain, The J. H., Co., Canton, O.

DOMESTIC ENGINEERING

Oswego Boiler Works, Oswego, N. Y.
Prizer-Painter Stove & Heater Co., The, Reading, Pa.
Roberts Machine Co., Collegeville, Pa.
Sheppard, Isaac A., & Co., Philadelphia, Pa.
Smith, H. B., Co., The, Westfield, Mass.
Smith & Thayer Co., Boston, Mass.
Swett, A. L., Iron Works, Medina, N. Y.
Thatcher Furnace Co., New York City.
United States Heater Co., Detroit, Mich.
Utica Heater Co., Utica, N. Y.
Wilks, S., Mfg. Co., Chicago, Ill.

Hopper Valves.

Asbell, S. J., Co., Paterson, N. J.
Crampton-Farley Brass Co., Kansas City, Mo.
G. McG. Mfg. Co., Philadelphia, Pa.
Zero Valve & Brass Mfg. Co., Buffalo, N. Y.

Hot Air Pumping Engines.

American Machine Co., Wilmington, Del.
Rider-Ericsson Engine Co., New York City.

Hose Reels.

Wirt & Knox Mfg. Co., Philadelphia, Pa.

Hydrants.

Kupferle, John C., St. Louis, Mo.

Hydro-Carbon Lamps.

Chicago Solar Light Co., Chicago.
Welsbach Co., Gloucester, N. J.

Incandescent Gas Mantles.

Acorn Brass Works, Chicago, Ill.
Welsbach Co., Gloucester, N. J.

Insertable Joints.

Estabrook's Sons, R., South Boston, Mass.
Vanderman Plumbing & Heating Co., The, Willimantic, Conn.

Lavatories.

McShane, Henry, Mfg. Co., Baltimore, Md.
McVay & Walker, Braddock, Pa.
Rundle Mfg. Co., Milwaukee, Wis.
Standard Sanitary Mfg. Co., Pittsburg, Pa.
Union Mfg. & Supply Co., Pittsburg, Pa.
Weiskittel, A., & Son, Baltimore, Md.
Wolff, L., Mfg. Co., Chicago, Ill.

Lead Pipe.

Lausten Lead Works, Chicago, Ill.
Blatchford, E. W., & Co., Chicago, Ill.
Raymond Lead Co., Chicago, Ill.

Lead Traps.

Blatchford, E. W., & Co., Chicago, Ill.

Local Closet Vent.

W. J. Scully Ventilator Co., Detroit Mich.

Natural Gas Specialties.

Hollands Mfg. Co., Erie, Pa.

Oakum.

Planet Mills Mfg. Co., Brooklyn, N. Y

Patents.

Dyer, Edmunds & Dyer, New York City.
Frothingham, N. L., New York City.
Sugar, S. S., New York City.

Packing.

Jenkins Bros., New York City.

Patterns.

Cope Pattern Works, Detroit, Mich.
Gobeille Pattern Co., Cleveland, O.
Michigan Stamping Co., Detroit, Mich.
Olmstead, H. B., Co., New York City.

Pipe Benders.

Billings Pipe Bender Mfg. Co., The, New York City.

Pipe Coverings.

Keasbey, Robert A., New York City.
Norristown Covering Co., Norristown, Pa.
United States Mineral Wool Co., New York City.

Pipe Cutting and Threading Machines.

Armstrong Mfg. Co., The, Bridgeport, Conn.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Curtis & Curtis Co., The, Bridgeport, Conn.
Hart Mfg. Co., Cleveland, O.
Hickman-Melhorn & Co., Pittsburg, Pa.
Jarecki Mfg. Co., Erie, Pa.
Oster Mfg. Co., Cleveland, O.

Pipe Cutting and Threading Tools.

Kemp, C. M., Mfg. Co., Baltimore, Md.
Livermore, H. F., Boston, Mass.
Merrell Mfg. Co., Toledo, O.
Saunder's Sons, D., Yonkers, N. Y.

Pipe Hangers.

Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kriebel & Co., Philadelphia, Pa.
Libbey, Parker & Co., Boston, Mass.
Penn Engineering Co., The, Philadelphia, Pa.

Pipe Hooks and Straps.

Berger Bros., Co., Philadelphia, Pa.

Pipe, Vises.

Armstrong Mfg. Co., The, Bridgeport, Conn.
Curtis & Curtis Co., The, Bridgeport, Conn.
Hollands Mfg. Co., Erie, Pa.
Parker, Chas., Co., Meriden, Conn.
Saunder's Sons, D., Yonkers, N. Y.

Pipe, Water and Gas.

Millar, Chas., & Son Co., Utica, N. Y.
Simmons, John, Co., New York City.

Pipe Wrenches.

Atlas Pipe Wrench Co., New York City.

Plumbers' Force Pumps.

Giant Pump Co., The, Philadelphia, Pa.
Noppel Pump Co., The, Hartford, Conn.
Perkes, Chas., Philadelphia, Pa.

Plumbers' Supplies, Tools and Specialties.

Colwell Lead Co., New York City.
Fleck Bros., Philadelphia, Pa.
Knight, Thos. G., Brooklyn, N. Y.
McDonald, A. Y., & Morrison Mfg. Co., Dubuque, Ia.
National Supply Co., The, Toledo, O.
Nelson, N. O., Mfg. Co., St. Louis, Mo.
Peck Bros. Co., Chicago, Ill.
Rumsey, L. M., Mfg. Co., St. Louis, Mo.
Robertson, The James, Mfg. Co., Baltimore, Md.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Sanitary Specialty Mfg. Co., Chicago, Ill.
Simmons, John, Co., New York City.

Stambach & Love, Philadelphia, Pa.
Wolff, L., Mfg. Co., Chicago, Ill.

Plumbers' Woodwork.

Olmstead, H. B., Co., New York City.

Solid Porcelain Sanitary Work.

Graham, Chas., Chemical Pottery Works, Brooklyn, N. Y.

Radiator Air Valves.

Argon Mfg. Co., The, Denver, Col.
Blake & Andros, Boston, Mass.
Chicago Air & Water Valve Co., Chicago, Ill.
Monash-Younker Co., Chicago, Ill.
Morgan & Co., Chicago, Ill.

Range Boilers.

Hayes Mfg. Co., Paterson, N. J.
Scaife, Wm. B., & Sons, Pittsburg, Pa.

Radiators, Steam and Hot Water.

American Radiator Co., Chicago, Ill.
Gurney Heater Mfg. Co., Boston, Mass.
Holland Radiator Co., New York City.
National Radiator Co., Johnstown, Pa.
Smith, H. B., Co., The, Westfield, Mass.
United States Radiator Co., Dunkirk, N. Y.

Reflectors.

Frink, I. P., New York City.

Sanitary Earthenware.

American Porcelain Co., New Brighton, Pa.
Sanitary Earthenware Specialty Co., The, Trenton, N. J.
Sanitary Specialty Mfg. Co., Chicago, Ill.
Standard Sanitary Pottery Co., Elizabeth, N. J.
Trenton Potteries Co., The, Trenton, N. J.
Universal Sanitary Mfg. Co., New Castle, Pa.

Shipping Tags.

American Mfg. Co., Battle Creek, Mich.

Sinks, Porcelain Enameled.

Humphryes Mfg. Co., The, Mansfield, O.
McShane, Henry, Mfg. Co., Baltimore, Md.
Standard Sanitary Mfg. Co., Pittsburg, Pa.

Sinks, Wrought Steel.

Kilbourne & Jacobs Mfg. Co., The, Columbus, O.

Solder.

Blatchford, E. W., & Co., Chicago, Ill.

Smooth-On Iron Cement.

Smooth-on Mfg. Co., Jersey City, N. J.

Steam Fitters' Supplies, Tools and Specialties.

Colwell Lead Co., New York City.
Fleck, Bros., Philadelphia, Pa.
McDonald, A. Y., & Morrison Mfg. Co., Dubuque, Ia.
National Supply Co., The, Toledo, O.
Nelson, N. O., Mfg. Co., St. Louis, Mo.
Rumsey, L. M., Mfg. Co., St. Louis, Mo.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Sanitary Specialty Mfg. Co., Chicago, Ill.
Simmons, John, Co., New York City.

Steam, Water and Gas Supplies, Tools and Specialties.

Walworth Mfg. Co., Boston, Mass.

Steel Encased Baths.

Jas. Walker & Sons, Detroit, Mich.

Stocks and Dies.

Armstrong Mfg. Co., The, Bridgeport, Conn.
Hart Mfg. Co., Cleveland, O.
Oster Mfg. Co., Cleveland, Ohio.
Saunder's Sons, D., Yonkers, N. Y.

Street Washers.

Kupferle, John C., St. Louis, Mo.

Joint Between Soil and Drain Pipe.

Ryan, Geo. F., & Co., Chicago, Ill.

Tapping Machine.

Hadesty, J. M., & Son, Tamaqua, Pa.

Temperature Regulating Valve.

Nash Regulating Valve Co., Detroit, Mich.

Traps.

Cudell, F. E., Cleveland, O.
Detroit Sanitary Supply Co., Detroit, Mich.
Lausten Lead Works, Chicago, Ill.

Tubing.

Benedict & Burnham Mfg. Co., Waterbury, Conn.

Unions and Flanges.

Jefferson Mfg. Co., Boston, Mass.

Unions.

Dart, E. M., Mfg. Co., Providence, R. I.
Flagg, Stanley G., & Co., Philadelphia, Pa.

Urinals, Pedestal and Wall.

The Blair-Wedekind Co., Louisville, Ky.

Valves.

Campbell, J. B., Brass Works, Erie, Pa.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Boston, Mass.
Hays Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., New York City.
Kinsey & Mahler Co., Peoria, Ill.
Sweet & Doyle, Cohoes, N. Y.

Vapor Heating Systems.

Trane, Jas. A., Vacuum Heating Co., La Crosse, Wis.
Vapor Htg. Co., York, Pa.

Vapor Shower Baths.

Vapor Shower Bath Co., Rochester, N. Y.

Washers.

Bell, Andrew, Newark, N. J.

Water Closet Combinations.

Colwell Lead Co., New York City.
Dececo Co., The, Boston, Mass.
Fleck, Bros., Philadelphia, Pa.
National Supply Co., Toledo, O.
Nelson, N. O., Mfg. Co., St. Louis, Mo.

Water Heaters.

Adam, W. J. Joliet, Ill.
Hollands Mfg. Co., Erie, Pa.
Humphrey Mfg. & Plating Co., The, Kalamazoo, Mich.
Instantaneous Water Heating Co., The, Chicago, Ill.
Kewanee Boiler Co., Kewanee, Ill.
Lawson, L. S., Homestead, Pa.
Monarch Water Heater Co., Pittsburg, Pa.
Oswego Boiler Works, Oswego, N. Y.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Wilks, S., Mfg. Co., Chicago, Ill.

Water Lifts.

Cleveland Faucet Co., The, Cleveland, O.

Water Meters.

Thomson Meter Co., Brooklyn, N. Y.
Buffalo Meter Co., Buffalo, N. Y.

Water Registers.

Desper, H. A., Worcester, Mass.

ALPHABETICAL LIST OF ADVERTISERS IN THE WEEKLY EDITIONS OF DOMESTIC ENGINEERING.

American Distributing Co., Syracuse, N. Y.
American Radiator Co., Chicago.
Anchor Sanitary Co., Pittsburg, Pa.
Areshaensel, C., & Co., Indianapolis, Ind.
Asbell, S. J., Company, The, Paterson, N. J.
Atlas Pipe Wrench Co., San Francisco, Cal., and New York, N. Y.

Barrett, James, Mfg. Co., Boston, Mass.
Bigley, R., Toronto, Ont.
Blake & Andros, Boston, Mass.
Blake, W. L., & Co., Portland, Me.
Boston Brass Co., Boston, Mass.
Boston Wood Rim Co., Ltd., Toronto, Ont.
Boyd, Burns & Co., Vancouver, B. C.
Boynton Furnace Co., The, Chicago, Ill.
Buckley-Hart Mfg. Co., Detroit, Mich.
Buffalo Forge Co., Buffalo, N. Y.

Callahan Supply Co., Worcester, Mass.
Campbell, J. B., Brass Works, Erie, Pa.
Canada Corundum Co., Ltd., The, Toronto, Ont.
Canfield, H. O., Bridgeport, Conn.
Carey, R. E., New York, N. Y.
Central Foundry Co., New York, N. Y.
Chicago, Milwaukee & St. Paul Railway, Chicago, Ill.
Clare Bros. & Co., Preston, Ont.
Clark, William E., Springfield, Mass.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Collins, Thomas C., & Co., Montreal, P. Q.
Columbia Heating Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Crane, Wm. M., Co., New York, N. Y.
Curtis & Curtis Co., The, Bridgeport, Conn.

Davis Co., The, John, Chicago, Ill.
Davis Regulator Co., G. M., Chicago, Ill.
Day Metallic Mfg. Co., Detroit, Mich.
Des Moines Mfg. & Supply Co., Des Moines, Iowa.
Detroit Lead Pipe & Sheet Lead Works, Detroit, Mich.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Dominion Radiator Co., Ltd., The, Toronto, Ont.
Du Bois, F. N., & Co., New York, N. Y.

Eclipse Electrotype & Engraving Co., Cleveland, O.
Estabrook's, R., Sons, South Boston, Mass.
Eureka Mineral Wool & Asbestos Co., Toronto, Ont.

Fairbanks Co., The, Montreal, P. Q.
Fort Pitt Supply Co., The, Pittsburgh, Pa.
Froelich, A., Estate of, New York, N. Y.

Garrett & Son, C. S., Philadelphia, Pa.
Giant Pump Co., The, Philadelphia, Pa.
Goderich Organ Co., The, Goderich, Ont.
Grosswiller, Jos. F., Supply Co., Toledo, Ohio.
Gurney Foundry Co., Ltd., The, Toronto, Ont.
Gurney Heater Mfg. Co., The, Boston, Mass.
Gurney, Tilden Co., Ltd., The, Hamilton, Ont.

Haas, Philip, Dayton, O.
Hardin, John, Chicago, Ill.
Harvey's, A., Sons Mfg. Co., Ltd., Detroit, Mich.
Hayes Mfg. Co., Paterson, N. J.
Herbert Boiler Co., Chicago, Ill.
Herrmann Furniture & Plumbers' Cabinet Works, New York, N. Y.
Hoffmann & Billings Mfg. Co., Milwaukee, Wis.

Holland Radiator Co., Chicago.
Houghton & Buxton Mfg. Co., Worcester, Mass.
Hyde, F., & Co., Montreal, P. Q.
Hygienic Disinfector Mfg. Co., Brooklyn, N. Y.
Jefferson Mfg. Co., Boston, Mass.
Jones, O. H., Hartford, Conn.
Kellogg-Mackay-Cameron Co., Chicago, Ill.
Kennedy Co., The, Cleveland, O.
Kewanee Boiler Co., Kewanee, Ill.
Kewanee Pneumatic Water Supply Co., Kewanee, Ill.
Kilbourne & Jacobs Mfg. Co., The, Columbus, O.
King, Hodenpyl & Co., Chicago, Ill.
King, Warden & Son, Ltd., Montreal, P. Q.
Knott & Van Arnam Mfg. Co., Coldwater, Mich.
Lipp, Louis Co., The, Cincinnati, O.
London Brass Works Co., Ltd., The, London, Ont.
Lunkenheimer Co., The, Cincinnati, O.
McCall & Sheer, New York, N. Y.
McDougall, R., Co., Ltd., The, Galt, Ont.
McEachren Heating & Ventilating Co., Galt, Ont.
Maddock, John, & Sons, Trenton, N. J.
Malbin & Kammerman, New York, N. Y.
Marsh, Jas., P. & Co., Chicago, Ill.
Mica Boiler Covering Co., Ltd., Toronto, Ont.
Mitchell, Robert, Co., The, Montreal, P. Q.
Morgan & Co., Chicago, Ill.
Morgan & Wright, Chicago, Ill.
Morrison, Jas., Brass Mfg. Co., Ltd., Toronto, Ont.
Mott, J. L., Iron Works, The, New York, N. Y.
Mueller H., Mfg. Co., Decatur, Ill.
Nason Manufacturing Co., New York, N. Y.
National Enameling & Stamping Co., Milwaukee, Wis.
National Mercantile Agency, Chicago, Ill.
National Supply Co., The, Toledo, O.
New Haven Novelty Machine Co., The, New Haven, Conn.
New York Washer Works, New York, N. Y.
Norristown Covering Co., Norristown, Pa.
Ohio Pump & Brass Co., Columbus, O.
Olmstead, H. B., Co., New York, N. Y.
Ontario Lead & Wire Co., Ltd., Toronto, Ont.
Page, Wm. H., Boiler Co., The, Norwich, Conn.
Peck Bros. Company, Chicago, Ill.
Pemberton Trap Co., Boston, Mass.
Polacheck, Chas., & Bro. Co., Milwaukee, Wis.
Powell, Wm., Co., The, Cincinnati, O.
Providence Steam Trap Co., Providence, R. I.
Pullis, P. P., Company, The, New York, N. Y.
Regester's Sons Co., J., Baltimore, Md.
Richmond Stove Co., Norwich, Conn.
Riverside Boiler Works, Cambridgeport, Mass.
Roberts Machine Co., Collegeville, Pa.
Ross Valve Co., Troy, N. Y.
Rundle Mfg. Co., Milwaukee, Wis.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Russell, Wm. A., & Co., New York, N. Y.
Ryan, J. J., & Co., Chicago, Ill.
Sanitary Specialty Mfg. Co., Chicago, Ill.
Shantz, I. E., & Co., Berlin, Ont.
Simmons, John, Co., The, New York, N. Y.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.
Smith & Thayer Co., Boston, Mass.
Southern Railway Co., New York, N. Y.
Speakman Supply & Pipe Co., Wilmington, Del.
Standard Sanitary Mfg. Co., Pittsburgh, Pa.
Star Iron Co., Ltd., The, Montreal, P. Q.
Steward & Romaine Mfg. Co., Philadelphia, Pa.
Sweet & Doyle, Cohoes, N. Y.
Sylvester Bros. Mfg. Co., Lindsay, Ont.
Syracuse Faucet & Valve Co., Syracuse, N. Y.
Trenton Potteries Co., Trenton, N. J.
Union Brass Works, Boston, Mass.
United States Radiator Co., Dunkirk, N. Y.
Van Meter, J. W., & Co., Philadelphia, Pa.
Vapor Shower Bath Co., Rochester, N.Y.
Vosburgh, W. C., Mfg. Co., Ltd., Brooklyn, N. Y.
Walker, James, & Son, Detroit, Mich.
Walls & Pearsall, Philadelphia, Pa.
Walworth Mfg. Co., Boston.
Warnock Mfg. Co., The, Boston, Mass.
Webb, F. W., Mfg. Co., Boston, Mass.
Webb, F. W., Mfg. Co., Montreal, P. Q.
Weissberg, Chas., New York, N. Y.
Western Plumbing Supply Co., Chicago, Ill.
Western Tube Co., Kewanee, Ill.
Wickes, John C., New York, N. Y.
Wilks, S., Mfg. Co., Chicago.
Williams & Marvin Mfg. Co., Deep River, Conn.
Wilson, R. M., Mfg. Co., Rome, N. Y.
Wolff, L., Mfg. Co., Chicago, Ill.
Wyckoff, A., & Son Co., Elmira, N. Y.
Yorkville Plumbers' Supply Depot, New York, N. Y.

CLASSIFIED LIST OF ADVERTISERS IN THE WEEKLY EDITIONS OF DOMESTIC ENGINEERING.

Air Valves.
Marsh, Jas. P., & Co., Chicago, Ill.

Autometers.
Mitchell Co., The Robert, Montreal, P. Q.

Back Water Gate Valves.
Barrett, Jas., Mfg. Co., Boston, Mass.
Iron Sanitary Mfg. Co., Chicago, Ill.

Ball Cocks.
Boston Brass Co., Boston, Mass.
Clark, William E., Springfield, Mass.
Jones, O. H., Hartford, Conn.

Basin Plugs.
Powell, William, Co., The, Cincinnati, Ohio.
Canfield, H. O., Bridgeport, Conn.

Bath Tubs.
Day Metallic Mfg. Co., New York City.
Walker, James & Son, Detroit, Mich.

Bath Tub Trap.
Pemberton Trap Co., The, Boston, Mass.

Bibbs.
Morrison, Jas., Brass Mfg. Co., The, Ltd., Toronto, Ont.

Brackets.
Van Meter, J. W., Co., Philadelphia, Pa.

Brass Basin Traps.
American Distributing Co., Syracuse, N. Y.

Closet Pulls.
Smith & Egge Mfg. Co., Bridgeport, Conn.
Williams & Marvin Mfg. Co., Deep River, Conn.

Cocks, Iron.
Western Tube Co., Kewanee, Ill.

Corundum.
Canada Corundum Co., The, Ltd., Toronto, Ont.

Couplings and Fittings.
New Haven Novelty Machine Co., The, New Haven, Conn.

Die Stocks.
Curtis & Curtis Co., The, Bridgeport, Conn.

Disinfectors.
Hygienic Disinfector Mfg. Co., Brooklyn, N. Y.

Domestic Water Supply System.
Kewanee Pneumatic Water Supply Co., Kewanee, Ill.

Engravers.
Eclipse Electrotype and Engraving Co., Cleveland, O.

Enameled Iron Goods.
Wickes, John C., New York City.

Exhaust Head.
McEachren Heating & Ventilating Co., Galt, Ont.

Expansion Bolts.
Steward & Romaine Mfg. Co., Philadelphia, Pa.

Fans, Heating and Ventilating.
Buffalo Forge Co., Buffalo, N. Y.

Faucets.
Syracuse Faucet & Valve Co., The, Syracuse, N. Y.
Union Brass Works, Boston, Mass.

Fittings.
Crane Co., Chicago, Ill.

Floor and Ceiling Plates.
Houghton & Buxton Mfg. Co., Worcester, Mass.
Nelson Mfg. Co., N. O., St. Louis, Mo.
Russell, W. A., & Co., New York City.

Force Pump.
Giant Pump Co., The, Philadelphia, Pa.

Frost Proof Hopper Valve.
Asbell, S. J., Co., The, Paterson, N. J.

Frost Proof Water Closets.
Haas, Philip, Dayton, O.
Walls & Pearsall, Philadelphia, Pa.

Fuller Work.
Ryan, J. J., & Co., Chicago, Ill.

Gas, Electric and Combination Fixtures.
Polacheck, Chas. & Bro. Co., Milwaukee, Wis.
Vosburgh, W. C., Mfg. Co., Brooklyn, N. Y.

Gate Valves.
Harvey's, A., Sons Mfg. Co., Ltd., Detroit, Mich.

Glass Float Holder.
Jones, O. H., Hartford, Conn.

Graphite.
Dixon, Joseph, Crucible Co., Jersey City, N. J.

Heaters, Steam and Hot Water.
American Radiator Co., Chicago, Ill.
Bigley, R., Toronto, Ont.
Boyd, Burns & Co., Vancouver, B. C.
Boynton Furnace Co., The, Chicago, Ill.
Clare Bros. & Co., Preston, Ont.
Columbia Heating Co., Chicago, Ill.
Des Moines Mfg. & Supply Co., Des Moines, Ia.
Gurney Heater Mfg. Co., Boston, Mass.
The Gurney Foundry Co., Ltd., Toronto, Ont.
Hayes Mfg. Co., Paterson, N. J.
Herbert Boiler Co., Chicago, Ill.
Kellogg-Mackay-Cameron Co., Chicago, Ill.
Kelsey Heating Co., Syracuse, N. Y.
Kewanee Boiler Co., Kewanee, Ill.
McDougall Co., The R., Ltd., Galt, Ont.
Star Iron Co., The, Ltd., Montreal, P. Q.
Walker & Pratt Mfg. Co., Boston, Mass.
King, Warden & Son, Ltd., Montreal, Canada.
Wilks, S., Mfg. Co., Chicago, Ill.

Illustrators and Photographers.
Pullis, P. P., Co., New York, N. Y.

Injectors.
Lunkenheimer Co., The, Cincinnati, O.
Regester's, J., Sons Co., Baltimore, Md.

Insertable Joints.
Estabrook's Sons, R., South Boston, Mass.

Lamps, Arc Gas.
Sanitary Specialty Mfg. Co., Chicago, Ill.

Laundry Tubs.
Hardin, John, Chicago, Ill.

Lavatories.
Rundle-Spence Mfg. Co., Milwaukee, Wis.
Wolff, L., Mfg. Co., Chicago, Ill.

Lead Pipe, Pig and Sheet Lead.
Detroit Lead Pipe & Sheet Lead Works, The, Detroit, Mich.

Lead Specialties.
Du Bois, F. N., & Co., New York City.

Packing.
Morgan & Wright, Chicago, Ill.
Norristown Covering Co., Norristown, Pa.

Pipe and Boiler Coverings.
Eureka Mineral Wool & Asbestos Co., Toronto, Ont.
Mica Boiler Covering Co., Ltd., Montreal, P. Q.
Norristown Covering Co., Norristown, Pa.
Wyckoff, A., & Son Co., Elmira, N. Y.

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Livermore, H. F., Boston, Mass.

Pipe Hangers.
Simmons, John Co., New York City.

Pipe Straps.
Smith & Egge Mfg. Co., The, Bridgeport, Conn.

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Walworth Mfg. Co., Boston, Mass.

Pipe Threading and Cutting Machines.
Shantz & Co., I. E., Berlin, Ont.

Plumbers' Brass Ferrules.
American Distributing Co., Syracuse, N. Y.

Plumbers' Castings.
Froelich, Estate of A., New York City.

Plumbers' Furnaces.
Clayton & Lambert Mfg. Co., Detroit, Mich.

Plumbers' Supplies, Tools and Specialties.
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McCall & Sheer, New York City.
Nason Mfg. Co., New York City.
Peck Bros. Co., Chicago, Ill.
Yorkville Plumbers' Supply Depot, New York City.

Plumbers' Woodwork.
Boston Wood Rim Co., Toronto, Ont.
Carey, R. E., New York City.
Goderich Organ Co., The, Goderich, Ont.
Herrmann's, New York City.
Olmstead, H. B., Co., New York City.

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Warnock Mfg. Co., The, Boston, Mass.

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Collins & Sons, Thomas C., Montreal, P. Q.
Standard Sanitary Mfg. Co., Pittsburgh, Pa.

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Sylvester Bros. Mfg. Co., Lindsay, Ont.

Radiators.
American Radiator Co., Chicago, Ill.
Boyd, Burns & Co., Vancouver, B. C.
The Dominion Radiator Co., Ltd., Toronto, Can.
The Gurney-Tilden Co., Ltd., Hamilton, Canada.
Holland Radiator Co., Chicago.
Kellogg-Mackay-Cameron Co., Chicago, Ill.
Mott, J. L., Iron Works, The, New York City.
United States Radiator Co., Dunkirk, N. Y.

Radiator Valves.
Blake & Andros, Boston, Mass.

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Ontario Lead & Wire Co., Ltd., Toronto, Ont.
Riverside Boiler Works, Boston, Mass.

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Davis, John, Co., The, Chicago, Ill.
Powers Regulator Co., The, Chicago, Ill.
Ross Valve Co., Troy, N. Y.

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Weissberg, Charles, New York City.

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Maddock, John, & Sons, Trenton, N. J.
Trenton Potteries Co., Trenton, N. J.

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Speakman Supply & Pipe Co., Wilmington, Del.

Shower Fixtures.
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Sinks.
Kilbourne & Jacobs Mfg. Co., The, Columbus, O.
National Enameling & Stamping Co., New York City.

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Hyde, F., & Co., Montreal, P. Q.

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Strong's Swivel Hose.
Aneshaensel, C., & Co., Indianapolis, Ind.

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Koven, L. O., & Bro., Jersey City, N. J.

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London Brass Works Co., The, Ltd., London, Ont.
Sweet & Doyle, Cohoes, N. Y.
Syracuse Faucet & Valve Co., The, Syracuse, N. Y.

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Russell, W. A., & Co., New York City.

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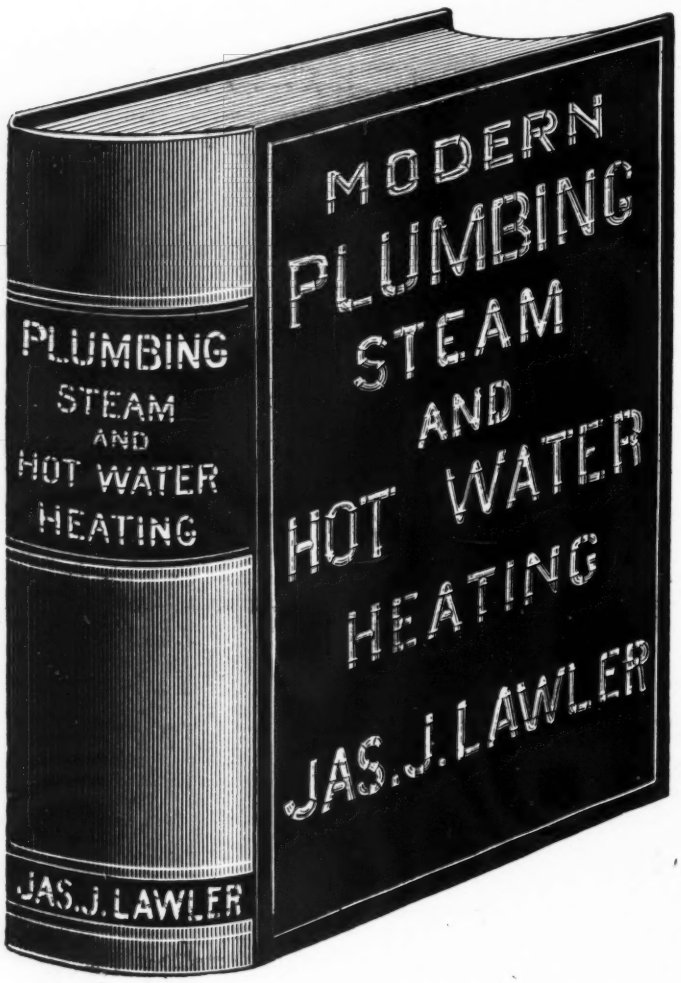

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It explains soil and waste pipe ventilation, back venting, the house trap, the fresh air inlet and their advantages. Siphonage of traps, the cause and how to remedy the same. How to test soil and waste pipes. Probable questions of plumbing examining boards, and answers to same. Hydraulics of plumbing, with original illustrations. Practical drawings and all important features in the construction of modern plumbing work.

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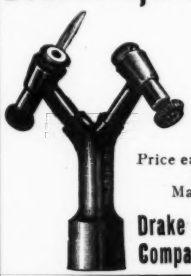

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HADESTY IMPROVED TAPPING MACHINE

For tapping water and gas mains against pressure. It leads them all. Sold on approval. Taps mains from 3 to 30 inches. No saddles required for different sized mains. Weight, complete, only 18 lbs. A boy 12 years old can make a connection in 15 minutes. Get prices from

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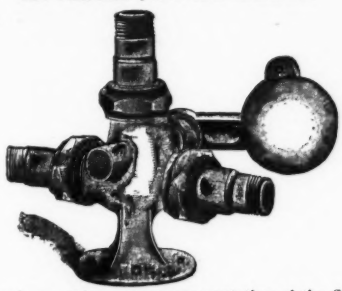
GET THE BEST, IT'S THE CHEAPEST



The above cut is an exact representation of the Star Hopper Valve, which we claim possesses more desirable points than any other Valve on the market. It wastes absolutely no water, the one straight stem setting firmly with solid ball on inlet end and hollow ball on waste end, is controlled by key stem or rock shaft to which the lever is attached. The action of this ball stem is in a straight horizontal movement and the fittings are so snug that rattling is impossible. The Valve closes with the pressure and is not affected by any variation in same. This hollow ball on the waste end of stem travels two-thirds of the stroke with the port closed, takes up any slack that might occur in seat chain, thereby preventing any waste of water passing through the soil pipe. The Star Hopper Valve was tested for two years by the Metropolitan Water Company, of Kansas City, Mo., and found to use no more water than a tank closed, it was then adapted and rated as a tank closed. The Star Hopper Valve is the most durable Valve on the market and will not require fifty cents for repairs in five years.

Crampton-Farley Brass Company

KANSAS CITY, MO.

One of Our Roll Rim Lavatories

WE ALSO MAKE A FULL LINE OF

BATH TUBS
CLOSETS

AND OTHER ENAMELED WARE

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Write for complete description of this and others.

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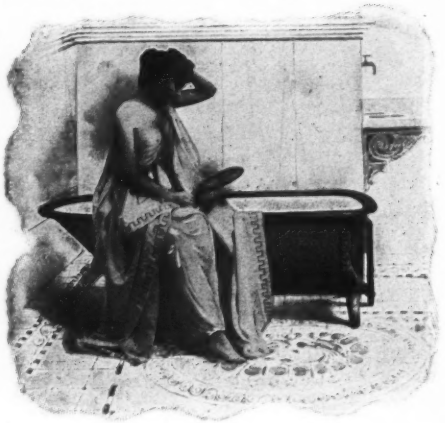

When your goods are marked with those stamps, you know you are getting the best.

Our ENAMELITE tub is a delight to the eye and the Steel Encased / Copper Lined of guaranteed full weight copper is the most durable on the market. Quality counts. The best is always the cheapest.

JAMES WALKER & SON.

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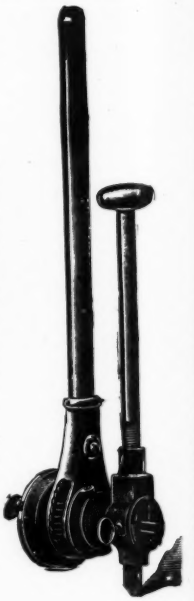

is an indispensable tool for conveniently threading iron pipe in ditches, under floors, in corners, overhead, etc. With this tool threads can be cut without removing whole lengths of pipe. This tool is provided with a strong vise which securely grips the pipe, and by means of the leading thread the die is forced on pipe and the thread is cut. It is made of malleable iron and steel, and, while light in weight, making it convenient to carry, is very strong and rigid. The advantages of this tool make it absolutely indispensable to Plumbers, Steam and Gas Pipe Fitters, Gas and Water Companies, Machinists, etc. It takes standard size dies, which are extra if furnished.

No. 1 threads ¼ to 1 inch pipe, takes die 2 and 2½ inches square.....$10.00

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For sale by leading jobbers.

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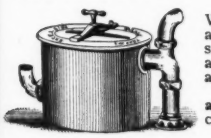

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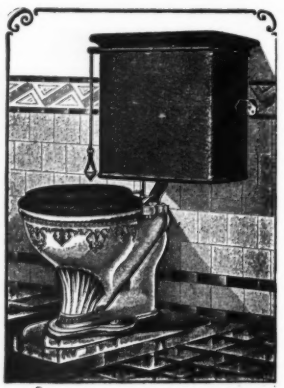
Seamless Fixtures.



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No Solder Inside of Tank.

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Indispensable to Plumbers

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FOR SOIL PIPE
Sizes 2 to 6 inches.
Light and Heavy.

Makes a neat job and saves your patience.

ASK YOUR JOBBERS FOR IT

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is the cheapest, the most efficient and the neatest water heater made. It occupies but little space and is always ready, furnishing hot water in a few seconds, day or night.

The Victor received the highest award at the Omaha Exposition in 1898.
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WIRE STRUNG TAGS A SPECIALTY
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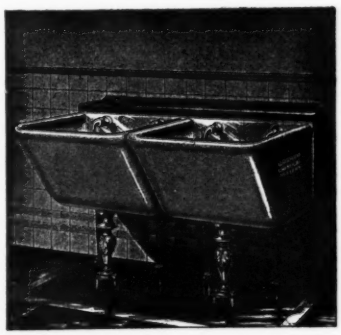

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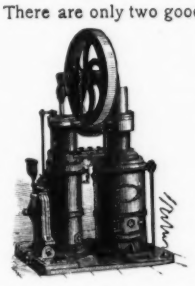

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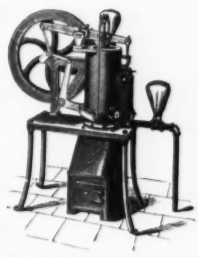

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water-main lurk the seeds of disease, unseen and perhaps unsuspected. They cannot get into houses where the **Lynn Filter** is on guard. It calls a halt to the germs and gives you a water you may drink freely without fear.

No Intricate Machinery, No Charcoal, Alum or Other "Coagulating" Contrivance.

Can be perfectly cleaned in little more time than you have spent on this advertisement.

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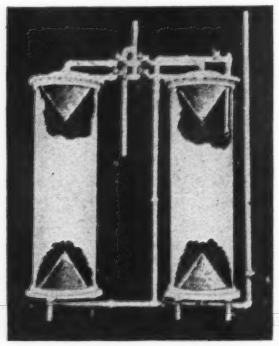

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No Alum or Coagulent used for Clarifying

Send for catalogue and hundreds of references on the best filter made in the U. S

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NO CORRODING. NO STICKING. THE BOTTOM DRIP COMPLETELY DRAINS BOTH PIPE AND VALVE UNDER ALL CONDITIONS. STRAIGHT FULL WAY. MADE TO LAST.

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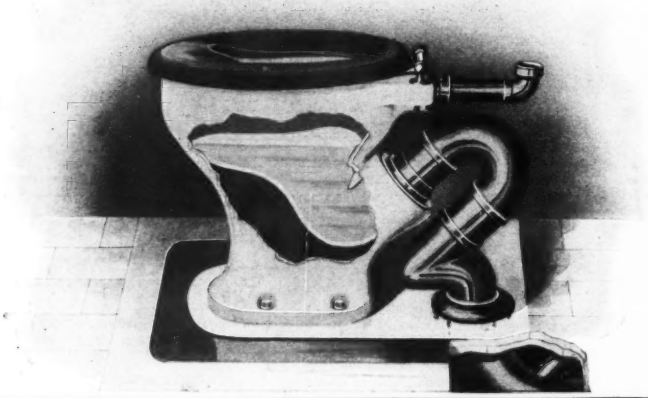

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No Jet.
Self-testing Submerged Outlet Joint.
Water Bills Reduced One Half.
Uses 3 gallons of water only. **Has large area of standing water.**
Trap can be emptied without disconnecting.
Outlet through floor or wall.

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Special Price on this Lavatory

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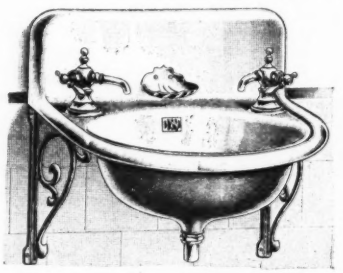

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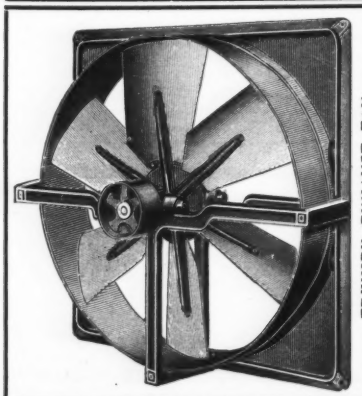

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CEILING, COUNTER AND FLOOR COLUMN FANS for belt power.

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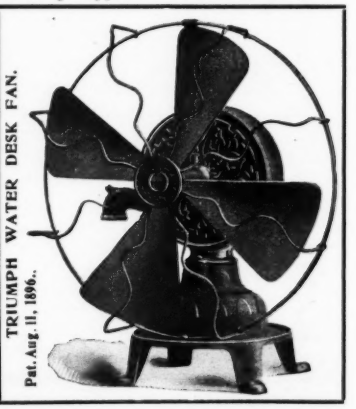

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Low Tank, Syphon Jet Closet Combination, is not as convincing as a complete

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We have other styles, too!

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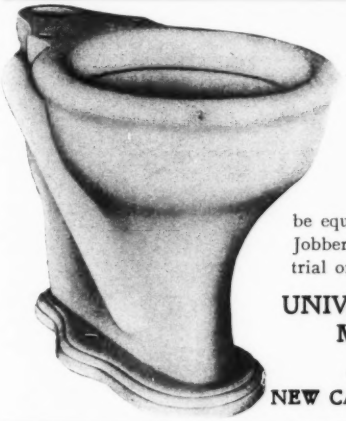

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NEW CASTLE, PA.

The Little Giant Pump

A MARVEL

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Always ready for instant use. It has a *Patent Force and Lift Cup* which will cover a 4 inch opening. It has a *Patent Adjustable Washer* from ¾ to 2 inches.

For Sale by the Leading Jobbers of the United States.

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Fig. 207

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House Force Pumps

with 3 inch Brass Cylinders. Suitable for raising water to any part of a house from cisterns or shallow wells. These pumps are painted red and gotten up in the best possible manner. Fitted with Brass Bibb Spout with back outlet.

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The Barnes Mfg. Co.

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THE MOST PERFECT PROTECTIVE COATING

FOR { GAS / WATER / STEAM

Or other pipe fittings, guaranteeing the threads from corrosion and destruction by frequent dissection is

WISCONSIN GRAPHITE PIPE-JOINT PASTE

It prevents leaks, the admission or emission of air, is not affected by moisture, alkali's, acids or intensities of temperature.

Pipe systems covered with Graphite Paint, and joints sealed with the Graphite Paste, defy wind and weather, heat or cold, wet or dry.

Address Dept. C,

Wisconsin Graphite Co.

Send for sample and price list.

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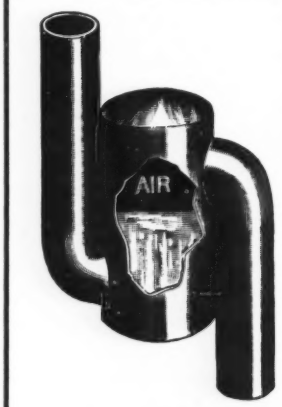
The best pump in the world cannot lift water from a dry well, but there is water down lower and a dry time is the best time to dig for it.



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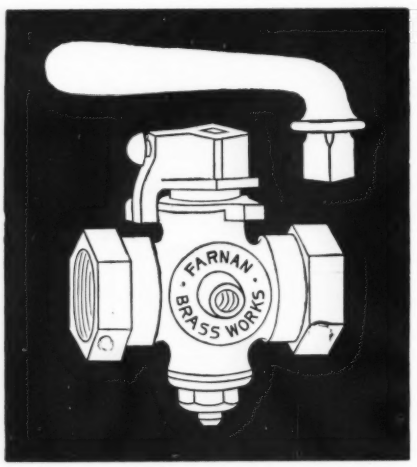
In using "Clean Sweep Traps" and Fuller Work you arrive to one logical fact due jointly to intelligent discrimination in accepting especially fine goods, and showing a possession of accurate working knowledge of ***How to do What you wish to do,*** with a regard also to giving your clientele the very best for their money.

"Clean Sweep Traps"—are the best traps made. "Clean Sweep Fuller Work"—preeminently the best made, and what helps—It's noiseless. Your Jobbers have them. Traps are sold in England, Germany, Norway, Canada and the United States.

Detroit Sanitary Supply Company

27 Jefferson Avenue DETROIT, MICH.

SOLE MANUFACTURERS



"IT DOES NOT LEAK AND GIVES SATISFACTION"

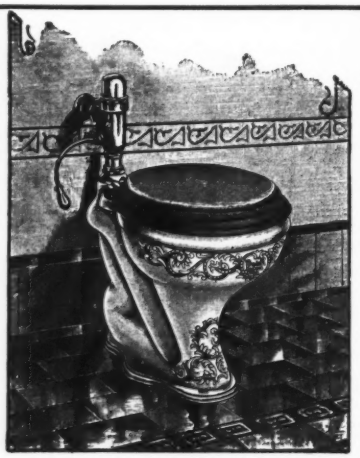
THAT'S WHAT SELLS THE

FARNAN

STOP AND WASTE

FARNAN BRASS WORKS

CLEVELAND, OHIO



PATENT APPLIED FOR

Fig. E. 99. ANGLO. Lever action.

IT WILL PAY YOU TO DROP US A LINE FOR OUR CIRCULARS AND PRICES OF

The Watrous

"AQUAMETER"

It is a self-measuring flush valve for water closets and urinals, automatically measuring the water for each flush. No more ball cocks, individual tanks or flush pipes needed, as it may be attached direct to pipe from city main or storage tank. Made in two styles, **lever action and seat action.** The WATROUS "AQUAMETER" is in use in many of the best buildings throughout the country, giving perfect satisfaction in all cases. We would be pleased to refer you to same on application. We use no cup washers in the construction of this valve. Manufactured and for sale by

Peck Brothers Company

231-237 Washington Street CHICAGO, ILL.

OBLONG SOAP DISH WITH REMOVABLE CHINA DISH.

CAST FEET.

BATH ROOM FURNISHINGS

OF EVERY DESRCIPTION

TOWEL RACKS SOAP DISHES SPONGE HOLDERS

COMBINATION SOAP AND SPONGE HOLDERS.
COMBINATION CHINA MUG WITH TOOTH BRUSH
VASE AND CUT GLASS TOOTH POWDER BOTTLE.

TOILET PAPER HOLDERS, MIRRORS, ETC.

THE "HOLDFAST" BATH SPRAY.

MANUFACTURED BY

S. STERNAU & CO.

204 CHURCH ST. WRITE FOR COMPLETE CATALOGUE NEW YORK CITY

TIDEWATER AND SEWER TRAP

BARRETT SPECIALTIES

TIDEWATER AND SEWER TRAPS,
O. D. BACK WATER VALVES,
CLEANOUTS, GREASE TRAPS.

BARRETT SPECIAL FITTINGS

BRASS RAILING, IN ANY FINISH.

JAMES BARRETT MFG. CO.

MANUFACTURERS AND
WHOLESALE DEALERS IN PLUMBERS SUPPLIES.

48-50 PEARL STREET
209-211 FRANKLIN STREET
BOSTON

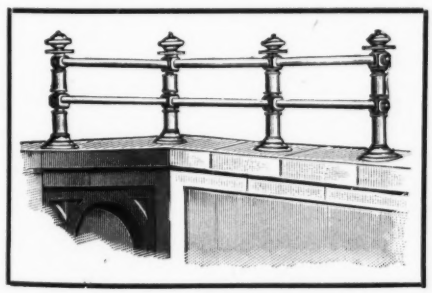
Lausten Lead Works

PRATT AND MORGAN STREETS
CHICAGO

Bi-metallic specialties
Lead traps and bends

Write for prices

Lead pipe, sheet lead
Ebony gloss plumbers' soil



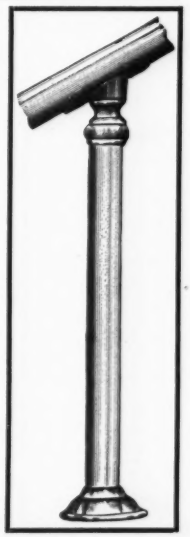
BRASS RAILING

HAND RAILS FOOT RAILS BANK RAILS
BAR RAILS STAIR RAILS STORE RAILS

ALL KIND OF RAILS

RAILS IN ANY FINISH

BRASS, BRONZE, OXIDIZED COPPER.
NICKEL, SILVER AND GOLD PLATED.



The Best Work and the Right Price.

The Columbus Brass Co., Long and Sixth Streets Columbus, Ohio.

ESTIMATES CHEERFULLY FURNISHED.

WE ARE NOW MAKING

Enameled

Iron Baths

Also Sinks and Lavatories

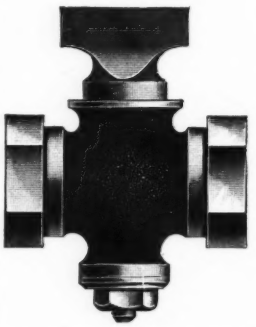
Send for Catalogue E.

Henry McShane Mfg. Co.

BALTIMORE, MD.

HAYS

Compression and Ground Key Work



Plumbers' Supplies

ORIGINAL

McNamara { Hydrants and Street Washers

HAYS MANUFACTURING CO.

ERIE, PA.

THE WONDERFUL "DORAN LIGHT"

Reduce Your Light Bills!

Let a "Doran Light" System solve the light problem for you. It guarantees, lamp for lamp, a light more brilliant, more steady, more penetrating than the electric arc

AT ABOUT ONE-TENTH THE COST!

1,200 Candle Power to each lamp. White, soft, diffusive light.

IT'S SAFETY IS BEYOND QUESTION.

Operated by gasoline supplied under air pressure. Connection with each lamp made by seamless wire tubing, leading to tank situated outside of building. Tubing can be put through crevices, around corners, etc., the same as an electric light wire. As many lights as desired in a system.

SEND FOR OUR CATALOG

explaining the most practical, most convenient, most economical lighting system yet devised.

ACORN BRASS WORKS,

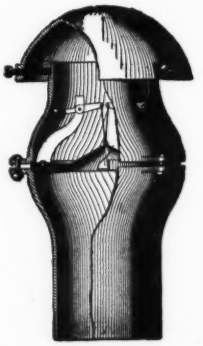
DEPT. D, 15 JEFFERSON ST., CHICAGO, ILL.

Good Agents Wanted for "Doran" System Lights and our "M. & M." Portable Arc Lamps (600 Candle Power). Exclusive territory allowed.

The Ayres..... Fresh Air Inlet

PATENTED

Adopted by the Department of Buildings of Greater New York



For Sale by Dealers in Plumbing Supplies only

MANUFACTURED BY

The Hart=Ayres Plumbing Co.

MANUFACTURERS OF PLUMBING SPECIALTIES

Fourth Avenue and Degraw Street, BROOKLYN, N. Y.

THE B. B. HIGH-PRESSURE BALL COCK

THE SIMPLEST AND BEST COCK EVER MADE

No special packing required. Ground joint coupling which is always tight. Roller bearing lever on cam, reducing friction to lowest amount. No hammering, no singing or whistling. Has only one packing which is easily removed. Removable seat of best steam metal. We are making Floats stamped with our B. B. which are thoroughly guaranteed. Ask your jobbers for them.

All sizes ½ to 3 inches inclusive

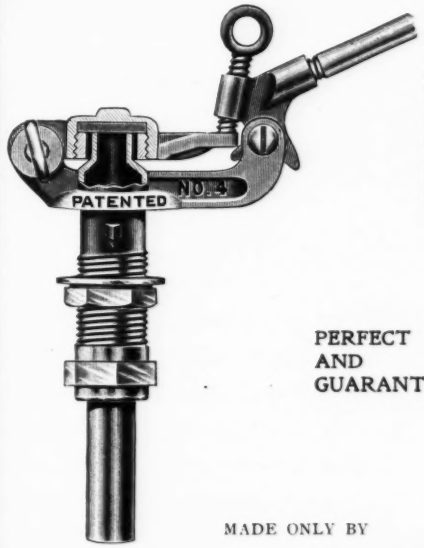
Removable Seat.

Made for Top, Bottom and End Supply.

Boston Brass Co., 36 & 38 Oliver St., **Boston, Mass.**

DALE

High Pressure Ball Cock



CANNOT POUND.
ALWAYS CLOSES.
ACCESSIBLE.
DURABLE.

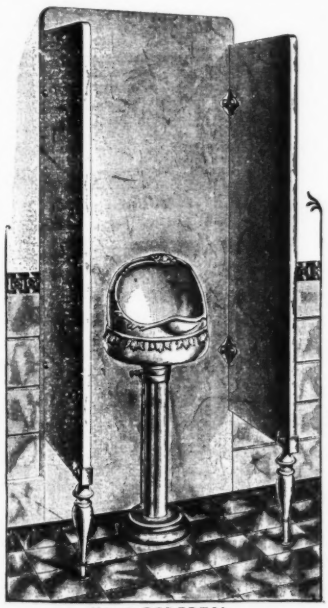
PERFECT AND GUARANTEED.

MADE ONLY BY

WOLVERINE BRASS WORKS

GRAND RAPIDS, MICH.

The Blair FOUNTAIN URINALS



No. 2 PEDESTAL.

The only Instantaneous Cleansing Urinal Made.

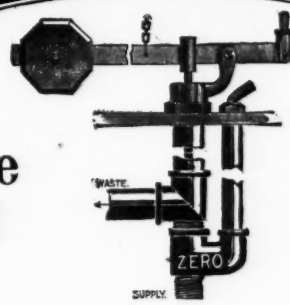
Absolutely Sanitary and Hygienic.
Odorless, Noiseless and Simple.

No tanks or floats. Requires one-fourth the water of any other. No place in Urinal where water and urine can remain to ferment. Cannot be stopped up and flood the building. Easy to clean. Made of the finest quality of vitrified ware. Can be placed anywhere.

THE PRICE IS RIGHT
Correspondence Solicited.

The Blair-Wedekind Company
Manufacturers of Sanitary Specialties
410 W. Chestnut St., Louisville, Ky.

WILL NOT FREEZE



Save Half the expense of installing closets by getting

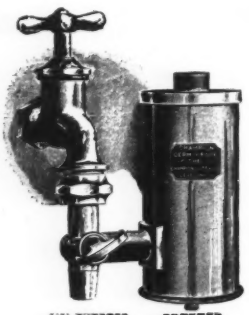
Zero Anti-Freezing Valves

They can be put in with half the time and half the labor because they do not require a pit or vault. They are simple and durable in construction — made without screws, springs or pins.

ZERO VALVE AND BRASS MFG. CO.
BUFFALO, N.Y.

The ◎ Champion

Water Filter



Is the only perfect and complete one!

Simple, easily cleaned and operated. Fits any faucet. Catalogue and prices of complete line upon application.

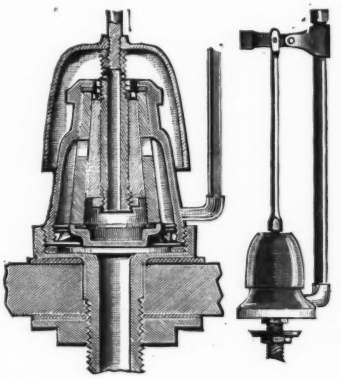
The Champion Safety Lock Co.

95 WOODLAND AVE. CLEVELAND, O.

THE CLARK AUTOMATIC VALVE OR BALL COCK

Self Closing

Tight Fitting



Noiseless in Operation

Positive in Action

Made on entirely new principles of construction, a ground plug and shell making a perfectly tight joint. Has no packings to wear out, hence is durable and economical.

Write for Circular and Price List.

WILLIAM E. CLARK

INVENTOR AND MANUFACTURER

140 State Street, Springfield, Mass.

TWO WAYS OF USING THE

NOPPEL PUMP

Obstructions in pipes usually can be more easily Sucked Up than Forced Through and you can get Suction or Pressure with the "NOPPEL" with ***No Change*** but in the direction in which you turn the handle.

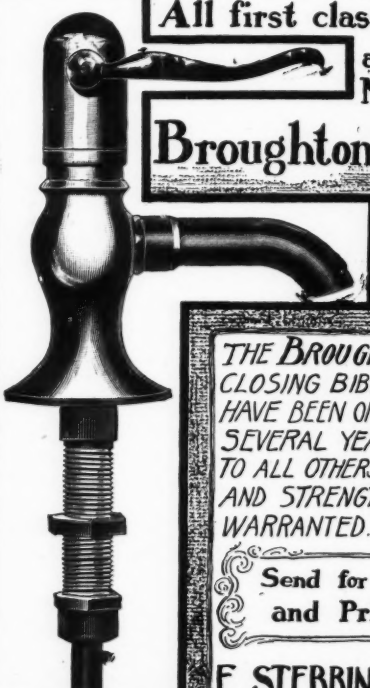
IT IS THEREFORE

THE ONLY TRUE COMBINATION LIFT, FORCE, DISCHARGE AND TEST PUMP

The Valve and Pump (except the wooden handle and leather cups on the piston) are made Entirely of Brass. ***It cannot rust, become clogged or wear out.*** Provided with our Patent Adjustable Plunger and Special Connections for reaching and fitting openings of various sizes and in awkward places including the Noppel Patent Suction Cup Also Special Attachments for use in Testing gas pipes, including our new back pressure valve, designed specially to work Quickly, Easily and Surely. Write for circular and price list, stating occupation and this paper.

THE NOPPEL PUMP COMPANY

P. O. BOX 1084. HARTFORD, CONN.



All first class Plumbers are using the New Style

Broughton Self Closing Basin Cock

NO EXPOSED SURFACES, EASILY KEPT CLEAN

THE BROUGHTON SELF-CLOSING BIBBS & COCKS HAVE BEEN ON THE MARKET SEVERAL YEARS - SUPERIOR TO ALL OTHERS FOR SIMPLICITY AND STRENGTH - EVERY ONE WARRANTED.

Send for Circular and Price List

E. STEBBINS MFG. CO.

SPRINGFIELD MASS.

Fleck Bros. Co.

Incorporated

46=50 N. Fifth Street, Philadelphia

The Largest Stock in Philadelphia of Plumbing and Heating Supplies

If we have your account on our books we would like to increase it. If we have no account with you we would like to open one

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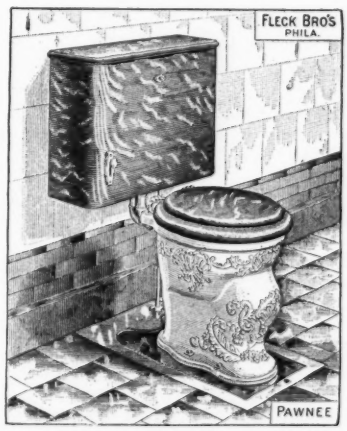
We Make Specialties Too

This is one

"PAWNEE"

Low
Down
Syphon
Hopper

WRITE FOR PRICES.



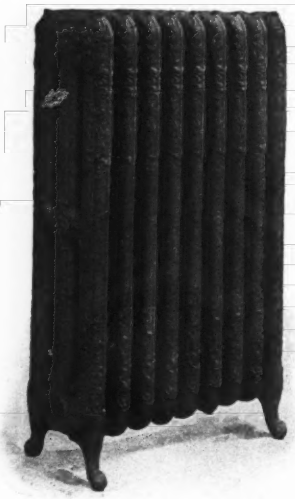
ROUGHS IN AT 12 INCHES

QUIET AND EFFECTIVE IN OPERATION.

We carry a Complete Stock of Low Downs

WRITE FOR PRICES.

All from one place



You can get everything needed on the job from us.

The latest addition in our line is—

Seneca Radiators

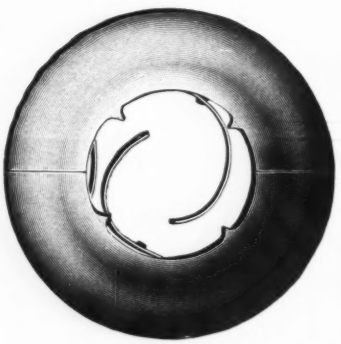
they embody all that is good in honest Radiator Building.

One of the most ornamental and best made Radiators on the market.

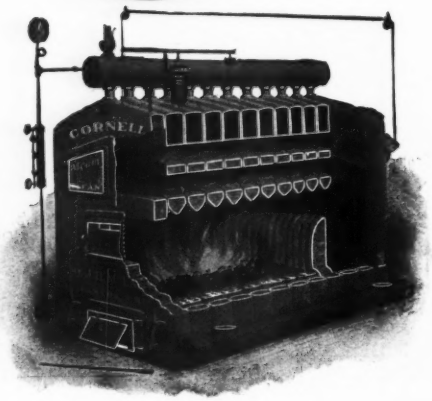
Large openings and perfect circulation.

They can not make Radiators any better than the "Seneca".

All sizes Steam and Water 2 and 3 column.



Hot Water and Steam Boilers that are business bringers for you. They advertise you every day they heat.



For Steam
Cornell
Cambridge
Oxford

For Hot Water
Princeton
Humber Amherst
Yale Sandow

Ask for prices on Supplies if you want the best at the same prices the "just as good" kind cost.

"Our Truth about Heating" would interest you. Don't you want it?

THE J. H. McLAIN COMPANY

WORKS AND MAIN OFFICE, CANTON, OHIO

BRANCHES: NEW YORK CHICAGO PHILADELPHIA INDIANAPOLIS

"You find us wherever Heat is required."

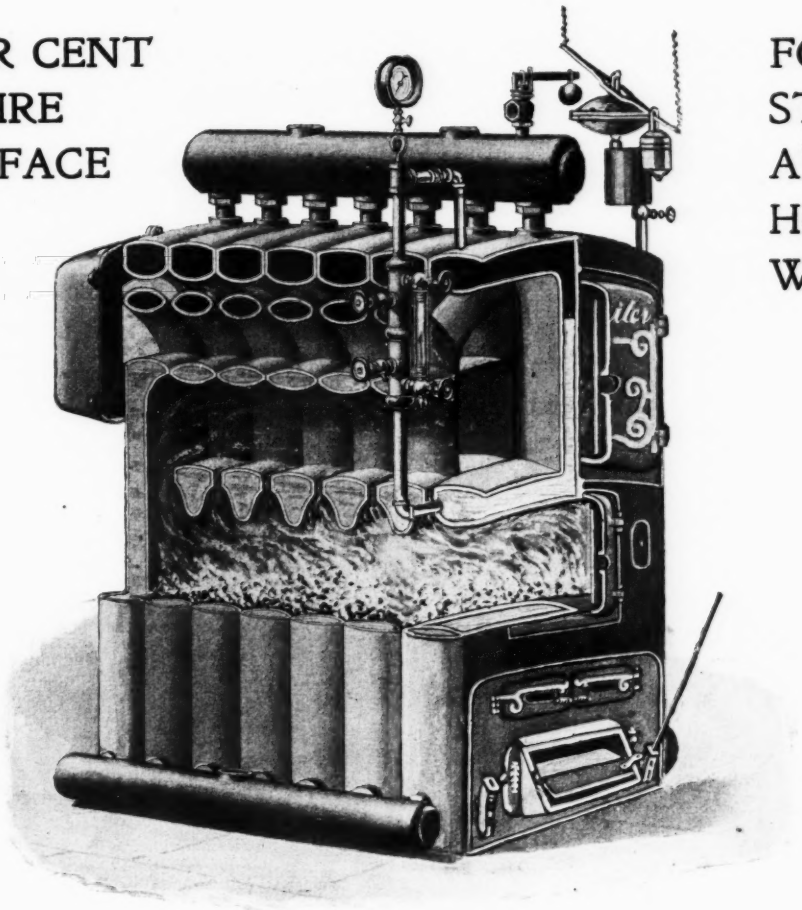
EXPERIENCE
of over half a
CENTURY
1842-1902

AWARDED
GOLD MEDAL
PARIS
1900

THE CARTON BOILERS

MAY BE DEPENDED UPON

75 PER CENT
FIRE
SURFACE



FOR
STEAM
AND
HOT
WATER

Notice the crown sheet and the course of the fire currents

ORIGINAL AND
SCIENTIFIC

Many improvements and additional fire surface for 1902

Ask for New Price List just issued

INTERNATIONAL HEATER COMPANY

LARGEST MAKERS OF HEATERS IN THE WORLD

UTICA, N. Y.

BOSTON NEW YORK CHICAGO DENVER

"Standard"

PORCELAIN ENAMELED CLOSETS

ARE THE MOST SANITARY MADE.

A surface that is hard, smooth and absolutely nonabsorbent is essential to perfect sanitation and is particularly desirable for Water Closets.

"Standard" PORCELAIN ENAMEL provides these features in the highest possible degree and is superior to all other materials, as it

Will not craze under frost and will not crack when frozen.

Every piece of "Standard" PORCELAIN ENAMEL WARE bears our guarantee label (in green and gold) or has our factories marks and initials S. S. M. Co. cast in on the relief exterior and

None Others are Genuine.

New Closet Catalogue now ready for distribution. Sent free on application.

Standard Sanitary Manufacturing Company,

GENERAL OFFICES:

PITTSBURGH, PA., U. S. A.

BRANCHES:

NEW YORK, 81 Fulton St.
BOSTON, 408 Converse Bldg.
PHILADELPHIA, 18 S. Seventh St.
ST. LOUIS, 622 Security Bldg.
CHICAGO, 415 Ashland Block.
CLEVELAND, 260 Prospect St.
LOUISVILLE, 325 W. Main St.
NEW ORLEANS, 204 St. Peter St.
MONTREAL, 301 St. James St.
LONDON, 22 Holborn Viaduct.

$1,000⁰⁰ IN CASH PRIZES

WILL BE PAID TO PROGRESSIVE PLUMBERS

To encourage the best methods of merchandising Sanitary Plumbing Goods, the following cash prizes will be paid to the Plumbers who will make the most attractive

Show Window Model Bath Room or Store Room Display

EQUIPPED ENTIRELY WITH

"Standard" Porcelain Enameled Baths and Plumbing Goods

CLASS	SHOW WINDOW	MODEL BATH ROOM	STORE ROOM
FIRST PRIZE	$250.00	$150.00	$100.00
SECOND "	150.00	100.00	65.00
THIRD "	100.00	50.00	35.00

THE DISPLAY CONTEST is open to all legitimate Master Plumbers in United States and Canada who conduct a regular business in Plumbing Supplies.

COMMITTEE OF AWARDS.

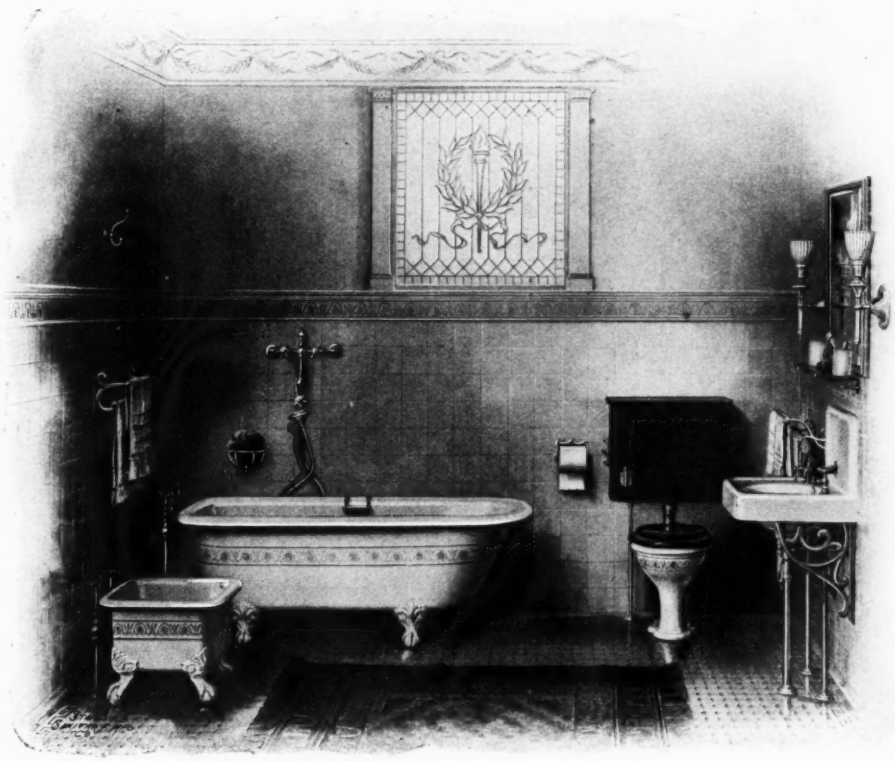
MR. JNO. K. ALLEN, PRESIDENT DOMESTIC ENGINEERING

MR. J. M. HEATHERTON, EDITOR PLUMBERS' TRADE JOURNAL

MR. H. A. SMITH, EDITOR ENGINEERING REVIEW

Descriptive pamphlet containing rules and conditions will be mailed on application to

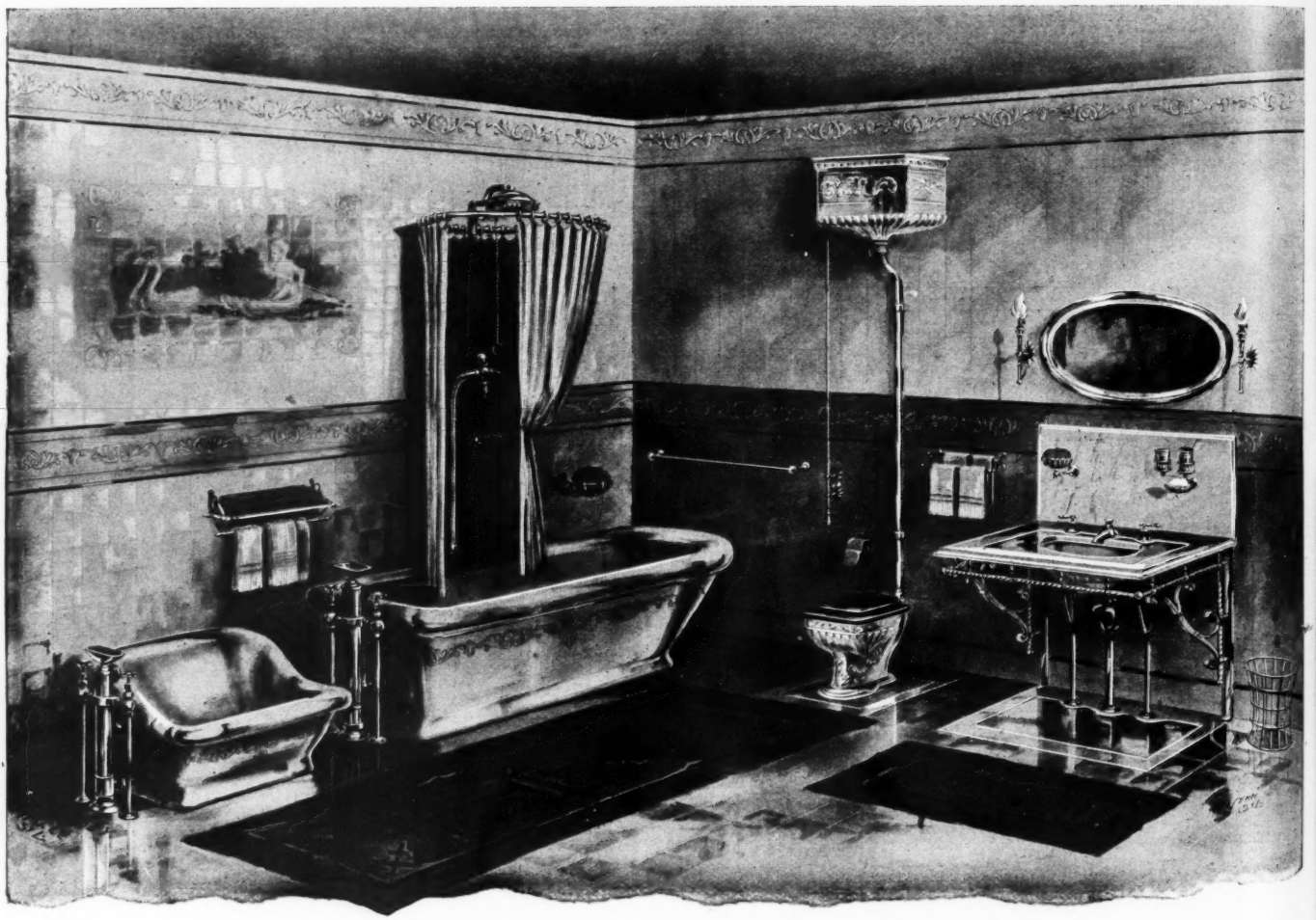
STANDARD SANITARY MFG. CO.
SALES DEPARTMENT, PITTSBURGH, PA.



There will be a series of different "Standard" Model Bath Room interiors similar to the above shown in this space for the next consecutive six months and a reproduction of any of these arrangements of goods or an original design will stand an equal chance of winning one of the prizes.

RUMSEY'S "UNA-SEAL"

BATH ROOM COMBINATION, COMPRISING



BATH.—"Una-Seal" Solid Porcelain Roll Rim Bath Tub, 5½ feet long, Class "A," with Porcelain Base to the floor, glazed inside and over Rim, exterior finished Zinc White with "Una-Seal" Decoration, Nickel-plated Low Bell Supply Fitting with Supply Pipes and "Superior' Waste, Nickel-Plated Combination Needle and Shower Bath with Rubber Lined White Curtain.

WATER CLOSET.—Square Embossed "Una-Seal" Syphon Jet Closet (Vitreous Ware) with Mahogany Seat and Cover, No. 25 Embossed Porcelain Syphon Tank, Nickel-Plated Flush and Supply Pipes, Nickel-Plated Rod and Pull Guide and Porcelain Pull. Decoration on Closet and Tank.

LAVATORY.—Italian Marble Lavatory, 34x24 inches with 16-inch Back, 14x19 D-shape Basin, Nickel-Plated "Olympian" Combination Supply and Waste Fixture, Nickel-Plated Supply Pipes, Trap and Ornamental Bracket, Nickel-Plated Soap, Tumbler, Brush and Sponge Holders, and 22x32-inch Plate Glass Mirror with Nickel-Plated Brass Frame.

SITZ BATH.—Solid Porcelain Roll Rim Sitz Bath, Class "A," with Porcelain Base to floor, glazed white inside and outside, with "Una-Seal" Decoration, Bell Supply Fitting with Brass Supply Pipes and "Superior" Waste.

L. M. RUMSEY MANUFACTURINC COMPANY

810 North Second Street, St. Louis, Mo.

The JAMES ROBERTSON MANUFACTURING COMPANY

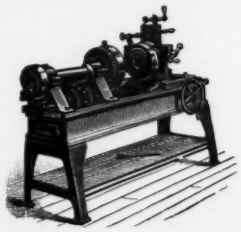
Manufacturers of

Lead Traps — *Enameled Bath Tubs*
Lead Bends — *Lavatories*
Lead Pipe — *Fine Brass Work*
Sheet Lead — *Sanitary Water Closets*
Block Tin Pipe — *Tanks, Seats, Etc.*
Lead and Iron Ferrules.

FACTORY: 827 South Howard St.

Supplies and Tools for Plumbers, Gas and Steam Fitters

OFFICE AND STORE:
30 Hanover St., **BALTIMORE**



PIPE THREADING AND CUTTING MACHINERY

To Cut from 1-8 inch to 18 inches

HAND OR POWER

Our Machines have Every Improvement for Accurate and Rapid Work.

Bignall & Keeler Mfg. Co., Edwardsville, Ill.

Peerless No. 3, Imp. ¼ in. to 3 in.

Agents: CHARLES CHURCHILL & CO., Ltd., LONDON.

DOMESTIC ENGINEERING

Leading Journal of its Class

CHARLES MILLAR & SON COMPANY

SELLING AGENTS, UTICA, N. Y.

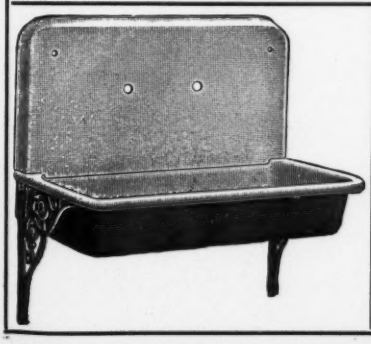
UTICA PIPE FOUNDRY CO.

CAST IRON PIPE

And Specials for Water and Gas. Wholesale Eastern Agents AKRON VITRIFIED SEWER PIPE.

Flanged Pipe and Fittings, Hydrants, Gates, Pig Lead, Jute, etc.
Manufacturers of Lead Pipe, Solder, etc., and Jobbers of Plumbers' and Tinners' Goods.

"The Cast Sink Must Go"



"Columbus" & "New Era"

Wrought Steel Sinks.

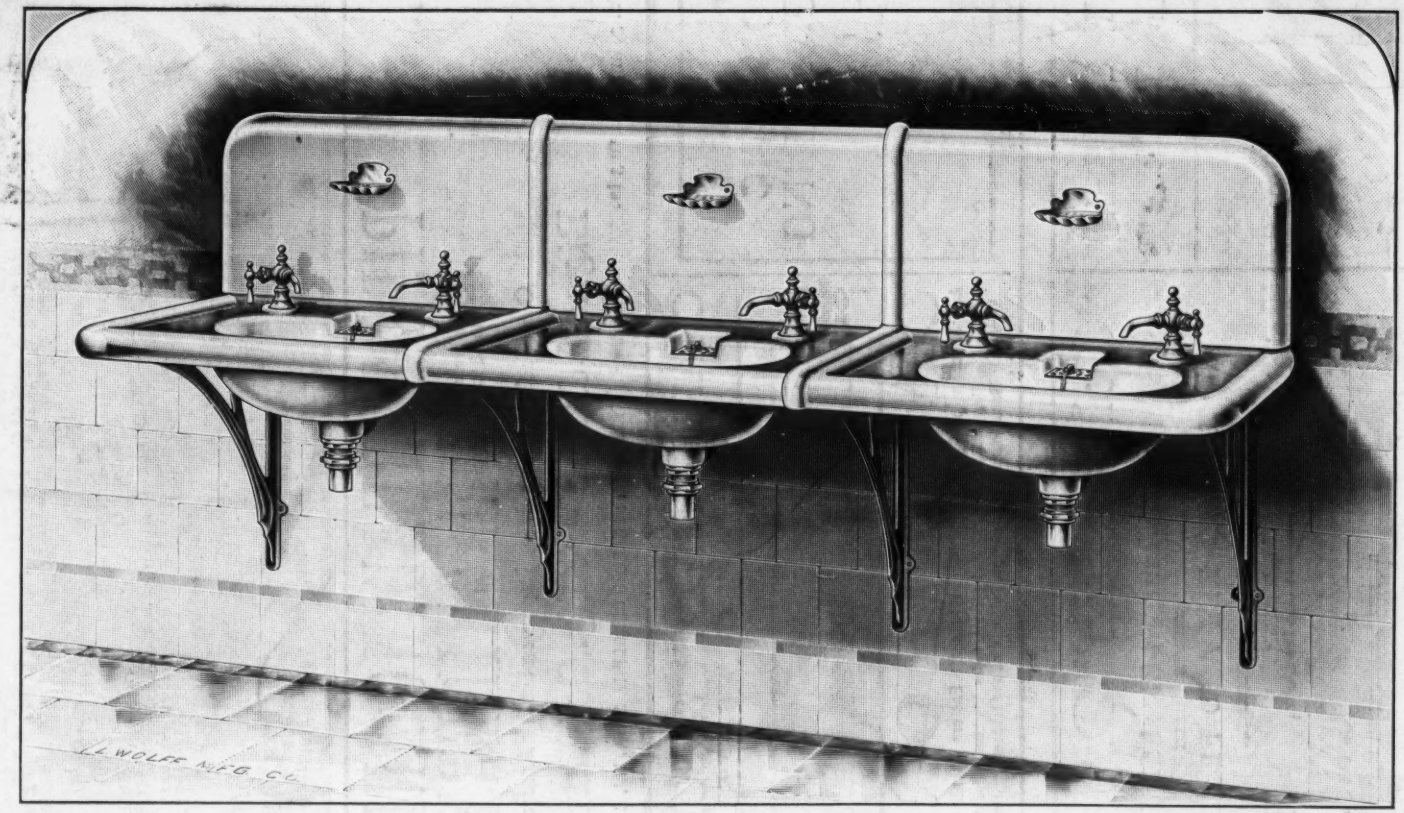
ROLLED RIM AND FLAT EDGES.

Painted, Galvanized, Blue Enameled,
Grey Enameled, White Enameled.

Write for Catalogue and Prices...

The Kilbourne & Jacobs Mfg. Co.,
COLUMBUS, OHIO.

L. WOLFF MANUFACTURING COMPANY



The above illustration shows the latest addition to our line of Enameled Iron Sectional Lavatories. Each section is 18 x 24 inches in size, having a straight back, D shape bowl, with extra large overflow fitted with N. P. brass strainer bolted to same. The roll rim on this Lavatory is extra large in size and curves under, giving same a very handsome effect. All joints are fitted with large lap where sections are joined together. The back is made with lower edge overlapping the back flange of slab, preventing any chance of water leaking through. N. P. Soap Cups are bolted to backs. Can be furnished with Right or Left hand end backs if so desired and also furnished with legs instead of brackets. We manufacture a complete line of Enameled Iron Lavatories of which samples are on exhibit at our Show Rooms, 91 Dearborn Street, Chicago.

L. WOLFF MANUFACTURING COMPANY

Branch; DENVER, COLO. **General Offices, 93 W. Lake Street, CHICAGO**